WORKSHOP8 architecture | planning | design

FLATIRONS EVENT CENTER

ASSESSMENT OF EXISTING BUILDING

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Executive summary

At the request of the City of Boulder Parks and Recreation Department, WORKSHOP8 and its team of subconsultants have performed a limited investigation and evaluation of the Event Center building at the Flatirons Golf Course in Boulder, Colorado. The investigation included observations of architectural, structural, mechanical, electrical and plumbing systems along with an assessment of the thermal performance and energy consumption of the structure and observation of civil (site) systems related to the structure and its immediate surroundings.

The investigation assesses current condition of the structure and its site and revisits and references conditions observed during an assessment completed in 2008. We note current conditions observed and any significant changes to systems that have occurred in the intervening five and one half years since the previous assessment.

The report attempts to provide an objective assessment of the condition of the building and its various systems based upon observations in 2008 and 2013. The report does not attempt to make value judgements other than to give an opinion of the conditions observed relative to our professional experience with other buildings of similar type, age and use.

In general we find a building at the end of its useful life, with out of date and deteriorated building systems, marginally adequate life safety systems, overwhelming accessibility shortcomings, extreme energy inefficiencies and substantial quantities of hazardous materials. A summary of our findings is as follows:

Building Systems

Several building systems: roofing, roof structure, mechanical and electrical systems are in extremely poor condition, functioning only marginally and with numerous code violations.

Roofing

- The roof membrane on the structure has been a source of problems for years and was the impetus for the original study of the structure in 2008. Conditions found in 2008 and persisting today include frequent water leaks that damage structural systems and interior finishes, inadequate slope for proper drainage resulting in standing water, poor or non-existent flashing of roof penetrations, repeated attempts at repair and reroofing without removal or correction of underlying problems.
- In 2008 the roof system was cored. Multiple layers of previous roof membranes and insulation systems were discovered including gravel ballast that was simply covered over by new roofing rather than being properly removed.
- Sources of leaks remain elusive and are so pervasive that the City of Boulder is paying a roofing contractor in excess of $1000 per month (approximately 16% of the total revenue generated by the structure) to maintain the roof membrane.

Roof structure

- The roof materials were and are saturated with water. Water being held within the roofing materials adds dead load to a roof structure not designed to carry it.
- Poor design, inadequate roof slope and deflection of overloaded framing members results in standing water - in some places multiple inches in depth - that adds even more dead load to those same framing members.
- Repeated and persistent water intrusion through the roof continues to threaten the adequacy of the roof structure. In many places wood sheathing materials have deteriorated due to wood rot, causing deformation and delamination. It is only a matter of time before portions of this system begin to fail with serious life safety consequences for occupants of the building.

Mechanical

- Heating and cooling units serving the building range in age from two to twenty plus years. A single RTU serving a small portion of the building was replaced within the last two years. This unit, along with another small unit

serving the snack bar on the east end of the structure could have a useful operational life of ten or more years. All other mechanical units are at or beyond their useful life and need replacement.

- Other mechanical systems including the grease hood exhaust system, kitchen make up air and the gas-fired boiler are all advanced in age and in poor condition. All have current code violations and all are inefficient in their energy consumption. The boiler providing hot water for the hydronic heat system is extremely old and likely operating at less than 60% efficiency.
- Capital costs to be incurred within the next two to three years to replace aging mechanical equipment and non-code compliant conditions will likely exceed $300,000.
- Distribution ductwork for virtually all of the structure is run above the roof. This does not meet current code and contributes to the building's poor energy performance. Correction of this single code violation will require the installation of an extremely costly variable refrigerant flow system or removal of the existing roof structure and reconstruction with a new roof structure with adequate depth to run ductwork within the insulated building envelope. The cost of remedying this one code violation alone is nearly $400,000.

Electrical

- The electrical system is adequately sized but aging and finding replacement parts will be increasingly difficult. As a result any substantial change to the system will require replacement of costly electrical gear and distribution panels.
- Numerous cases of improper electrical distribution systems exist from improperly supported conduit to conduit laying in ponded water on the roof to exposed wiring. All are code violations and should be corrected to improve building safety.

General

- Maintenance costs for some of these systems are skyrocketing and threatening to overwhelm the limited revenue potential for the building. It appears that one result of this is the deferral of maintenance which in turn causes the systems to deteriorate faster. Some of these systems are approaching the point where they will become health and life safety risks to occupants of the structure.

Life Safety and Accessibility

Designed for a different use, the building has been repurposed with only minor renovation and replanning. The result is a building with barely adequate life safety exiting systems and wholly inadequate accessibility.

Life Safety

- Fire protection systems were upgraded in 2008 in response to shortcomings noted in the 2008 assessment. This system is in the best condition of any within the structure.
- Exiting systems contain multiple code violations that threaten occupant safety. Among the conditions noted are: exit paths blocked by equipment stored by the tenant, exit paths with non-compliant stair systems (constructed since the 2008 report) and an exit path containing a gas-fired appliance. Perhaps most egregious, since 2008 the tenant has moved an accessory structure on the west side of the building to a position that severely limits the available exit width and hence efficiency of the emergency egress system.
- Egress lighting is non-code compliant.

Accessibility

- Accessibility issues present in the structure are almost too numerous to note. They include among others:
    - inadequate clear width at exit paths and along paths of travel
    - inadequate clear floor area for turning within spaces
    - inadequate clear width at doors
    - inadequate clearances adjacent to doors
    - improper door hardware
    - improper clearance at plumbing fixtures
    - changes in floor level exceeding 1/4"
    - no warning devices for elements projecting from wall or hanging from ceilings
- Representative of the breadth of the issue:

- virtually no door within the structure meets the requirements for width, clearances adjacent to the operable leaf, hardware operation and/or operating force. Simply making every door within the structure compliant will require an almost complete demolition of interior systems.
- limited clearances within the existing kitchen would require complete demolition and reconstruction in a space approximately 20% larger than current.

It is important to note that while accessibility requirements are being included in current building codes the primary means of enforcing accessibility compliance is through the Americans with Disabilities Act. This law allows citizens to bring litigation against building owners whose structures do not meet ADA standards. Although most of the Events Center was constructed prior to the passage of the ADA, recent renovations of restroom facilities (since 2008) still contain several violations that may expose the city to a potential lawsuit.

Energy

As part of the current assessment we have also investigated energy consumption in the structure. An outdated and uninsulated building envelope combined with aging and inefficient mechanical systems, inadequate space within the thermal envelope for mechanical distribution systems and inefficient lighting systems result in utility costs that are extreme.

- Existing uninsulated masonry walls lose over 600% more energy than and typical wall designed to meet the energy code.
- Electric and natural gas use at the Flatirons Event Center that is more than 500% of the national average for structures of similar use and size.

Achieving energy code compliance will require a comprehensive renovation of virtually every building system including: roof structure, building envelope insulation and air infiltration barriers, windows, doors, water heating, HVAC, ventilation and energy recovery and lighting.

Hazardous Materials

The structure contains a significant quantity of hazardous materials.

Asbestos

Asbestos containing materials in particular are prevalent throughout the building.

- Materials within the structure that have tested positive for asbestos include: flooring, window glazing, ceiling texture.
- Materials not tested but assumed to contain asbestos include: roof felts and tar, transite ceiling panels. The ceiling texture and the transite panels are considered to be highly friable and pose a significant health risk.

The structure contains more than 3,000 s.f. of highly friable transite panels, more than 4,000 s.f. of highly friable acoustical ceiling texture and approximately 3,000 s.f of asbestos vinyl floor tile. In addition the cmu walls throughout the structure have been coated with a block filler that contains a trace of asbestos.

These substances pose a direct threat to the health of occupants and the general health and viability of the structure. Because they occur in so many locations and systems it will be difficult to maintain the structure without disturbing them and placing occupants at risk.

Mold

- Immediately after the flooding in September 2013 the structure tested high for airborne mold spores. Removal of all material that had been wetted during the event and ventilation of spaces did eventually bring mold levels down to approximately those occurring naturally outside the structure.
- Mold has been present in the structure since prior to the time of the 2008 assessment. At that time mold was observed on saturated roof sheathing and framing members. Those surfaces have been cleaned and covered by a coat of paint to entomb any remaining mold spores. The paint may however hasten the deterioration of the roof sheathing by not allowing moisture within the saturated roof systems to dry by evaporating to interior spaces.

EXECUTIVE SUMMARY

Flood Hazards

In addition to assessing the current condition of building systems generally we have noted specific damage resulting from the September 2013 flood. Our investigation also addresses the ongoing flood risk for the structure and its site and delineates a scope of work to “dry flood proof” the building in compliance with FEMA/NFIP requirements.

The structure sits within the South Boulder Creek floodplain. Its site is nearly flat with inadequate slope to allow for proper drainage. The grade adjacent to an outdoor terrace on the south side of the structure creates a sump condition which relies on mechanical pumps to move water away from the structure. Long sustained rain events like that of September 2013 or even short intense storms typical in spring and early summer can overwhelm the system and have lead to repeated flooding of the structure.

The damage incurred by the structure in 2013 appears not to have been caused by floodwaters from South Boulder Creek but from sump pumps on the south side of the structure becoming overwhelmed or simply losing power during the storm. Should a flash flood occur creating flows across the golf course that rise to the Base Flood Elevation anticipated in current flood mapping the damage to the structure will be far greater than that of 2013 based simply upon water adjacent to and within the structure at depths several times the 1” - 2” depth that occurred last September.

Flood proofing of the structure will require one of two alternatives:

- construction of a flood proof exterior envelope including flood proof doors and revised finish systems both interior and exterior that limit flood damage to the structure
- demolition of the structure, elevating a portion of the site to support a new structure, elevating a portion of the site to support new parking for proper accessibility of the structure, potential reconfiguration of adjacent golf course areas to insure that increased flows adjacent to the elevated structure and parking do not adversely affect adjacent properties.

The first alternative is intended solely to limit property losses. The second alternative both limits property losses and life safety hazards.

Capital Costs

The report concludes with a series of defined scenarios for the future of the structure. Within each scenario we define the scope of work necessary and develop a construction cost estimate to complete the work. As expected, with each successive level of repair/renovation/replacement total capital costs increase.

1	**Scenario A**	Repair to pre-flood condition (repairs finishes and systems damaged by water in September 2013)	**$213,555**
2	**Scenario B**	Flood proofing of the structure (includes revisions to the structure only - no revisions to parking or the site are included - and includes scope of work outlined in Scenario A above.)	**$519,374**
3	**Scenario C**	Renovation of the structure to full code compliance relative to current City of Boulder requirements (includes repair of finishes (Scenario A) and flood proofing of structure (Scenario B above.)	**$2,912,725**
4	**Scenario D**	Demolition of the existing Event Center, repair of the snack bar for ongoing use by the golf course and construction of a new restroom facility for golf patrons	**$609,550**

5	**Scenario E**	demolition of the entire structure and construction of a new golf clubhouse and restaurant (includes revisions to the parking lot and approach road and includes modifications to the golf course and driving range as outlined in the 2010 Dye Design Business Plan.)	**$3,359,881**
6	**Scenario F**	demolition of the entire structure and construction of a new event center with integrated restaurant and golf clubhouse (includes revisions to the parking lot and approach road and includes modifications to the golf course and driving range as outlined in the 2010 Dye Design Business Plan.)	**$6,751,049**

Of note, existing systems within the structure are in such poor condition that renovation of the building to code compliance results in a cost in excess of $2.9M which translates into a unit cost of $171/s.f. This cost, which very nearly equals the cost for$ an entirely new structure, only provides for code compliance of current systems. It does not include the redesign of the structure to better fit the needs and function of the current use or any opportunities for a better designed, more appealing and valuable building.

Conclusion

Clearly, the existing structure is in poor condition and is in need of a huge capital infusion just to keep it marginally functional. In addition the structure possesses many immediate and near term hazards, resulting in considerable risk exposure for the city. In return for carrying this risk the city receives $6,000 per month in revenue from the structure. Renovation to bring the structure into code compliance and minimize the municipality's risk will require capital investment equal to nearly forty years worth of current revenues.

It will be up to city staff and elected officials to determine whether the revenue generated by the structure represents an acceptable return given the risks and investment necessary or whether some other form of investment in the property is necessary for the site to continue in service to the community.

Our investigation does not make a recommendation for any one scenario over the others except to note that action is required. The building continues to deteriorate and may soon start to experience failures in several systems. Continued inaction will only increase the city's exposure to litigation arising from health and life safety issues.

* * * * * * * *

We appreciate being given the opportunity to undertake the assessment of the Flatirons Events Center. We are available to respond to questions and/or comments from city staff and elected officials as needed and are willing to provide our professional expertise and opinion in support of the City of Boulder's analysis and determination of the future of the structure.

Overview - 2013 Analysis

Our present analysis focuses upon the following aspects of the Flatiron Event Center:

1. Flood damage incurred by different building systems as a result of the September 2013 flood event,
2. Understanding of the ongoing flood risk and determination of construction systems and elements that should be implemented in order to "flood proof" the existing structure and mitigate against future damage
3. A current assessment of building systems and elements with a comparison to conditions observed in 2008 and
4. Development of cost estimates for a range of future scenarios for the Event Center and its site.

The assessment team, together with City of Boulder staff, has established six likely repair/renovation/replacement scenarios for the Event Center. Those scenarios are:

1. Repair to pre-flood condition
2. Flood proofing of existing structure to minimize future loss
3. Renovation of the structure to full code compliance relative to current City of Boulder requirements
4. Demolition of the existing Event Center and repair of the Just Hit It snack bar for ongoing use by the golf course
5. Demolition of the entire structure with an estimate of costs to construct a new 5,000 s.f. golf clubhouse facility with restaurant
6. Demolition of the entire structure with an estimate of costs to construct a new 13,000 s.f. event center with ballroom, ancillary meeting space, restaurant, commercial kitchen and golf clubhouse facility.

Flood Damage and Flood Risk

The current analysis has been undertaken in part because of the flooding that occurred in September 2013. That event damaged some building systems, primarily architectural finishes. Although the damage turned out to be relatively minor the event did raise larger questions surrounding the flood risk of the site and the appropriateness of repairing the building given its poor condition and the potential for future events of similar or greater impact.

Within the first section of the assessment is a brief description of the flood event and the damage incurred by the structure.

Also within this section is documentation of the Base Flood Elevation (BFE) for the structure, its Flood Protection Elevation and the impact of these key measurements on any potential renovation of the structure. The section includes a summary of relevant FEMA/NFIP requirements for new construction or substantial modification of existing construction to create a non-residential structure with a finished floor below the BFE that is "dry flood proofed."

Assessment of Existing Structure

This analysis revisits the conditions of the building in 2008 and reviews the current conditions of a number of the most significant building systems and hazards. We note conditions, circumstances and locations of each.

Several different disciplines have participated in producing the overall analysis of the structure. One portion of the report focuses on architectural systems: building envelope, interior finish systems, life safety, accessibility and environmental hazards. Other disciplines follow to address site and civil engineering issues, structural, mechanical, electrical and plumbing issues and energy performance. Within each portion of the assessment we attempt to describe discrete scopes of work for the repair to pre-flood conditions, flood proof in compliance with NFIP regulations and renovation to full code compliance.

Cost Estimates

Based upon conditions observed and noted in the assessment we have put together a set of construction costs for each threshold level of repair/renovation/replacement outlined in the six scenarios listed above. Within each scenario describe the scope of work included, list the anticipated total cost and provide a spreadsheet with breakdown of cost by scope of work.

PART 1

FLOOD FEMA/NFIP

Flood Risk and Damage Assessment

Overview

The Flatiron Event Center is located in the center of the Flatirons Golf Course in east Boulder. Most of the golf course is within the South Boulder Creek floodplain. We have surveyed the property to determine the following:

1. Location of the structure within the flood zone
2. Elevation of the structure relative to the Base Flood Elevations (BFE) for the site.

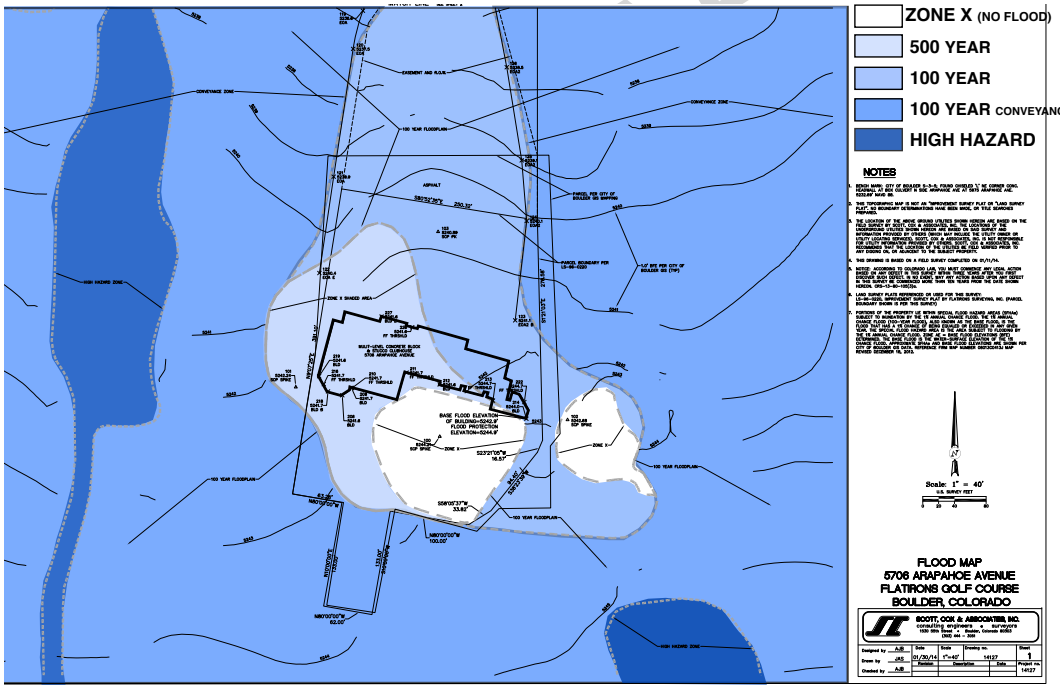
Location

Our analysis is based upon the most recent flood mapping data for the South Boulder Creek drainage. The updated mapping data was prepared by the City of Boulder and adopted by FEMA in 2012.

Most of the Flatirons Golf Course is within the 100 year flood plain for South Boulder Creek. A majority of the course is within the conveyance zone of a 100 year event. Refer to the attached National Flood Insurance Program (NFIP) Flood Insurance Rate Map (FIRM). The majority of the golf course site is within Zone AE.

There are two small areas near the center of the golf course that are higher in elevation, above the 100 year flood plain and within Zone X. The Flatirons Event Center sits just to the northwest of the westernmost of these “islands.”

A portion of the existing structure sits within the 100 year flood zone just to the north of the westernmost island and the remainder is within the 500 year flood zone to the northwest of the westernmost island. The building does not sit within the conveyance zone. Please refer to Diagram 1 showing flood zones and the building footprint. For supplementary information refer to the attached survey.



Flood Diagram 1 showing footprint of building and parking lot on flood map designations

The parking lot to the north of the structure is almost entirely within the 100 year flood zone but is outside of the conveyance zone. The access road from Arapahoe Avenue is within the 100 year flood zone and the conveyance zone. No portion of the existing structure or its affiliated parking and vehicular access is within a high hazard zone.

Elevation

Our analysis of flood elevations is based upon City of Boulder GIS information and surveyed elevations of existing construction and site elements.

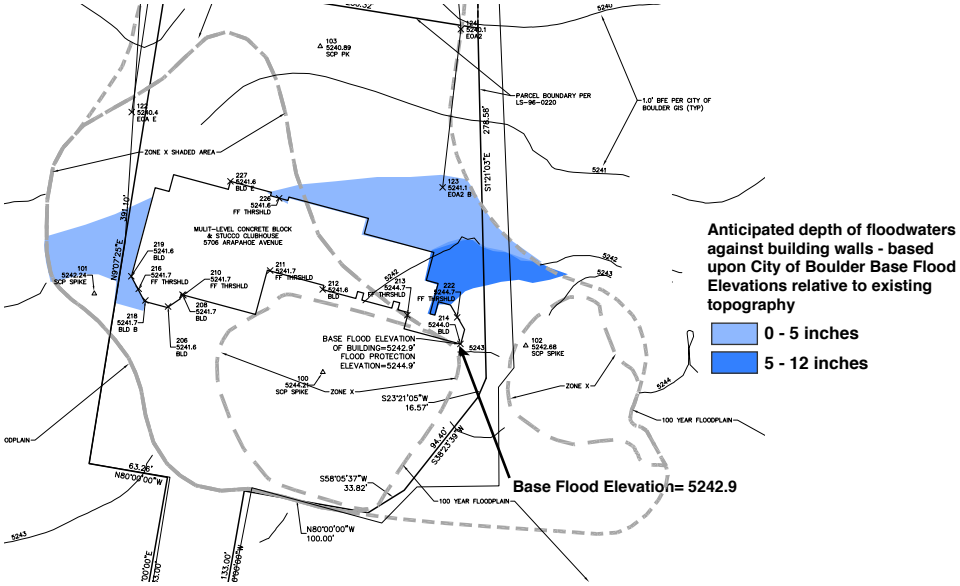
The floor elevation of the Flatirons Event Center is 5241.6 feet.
The floor elevation of the Just Hit It Grill is 5244.7 feet.

The BFE for the structure is 5242.9 feet at the southeast corner of the structure.

The Flood Protection Elevation for the structure is 5244.9 feet. The building would need to be elevated to this level or have flood protection devices in place to prevent any water intrusion up to this level.

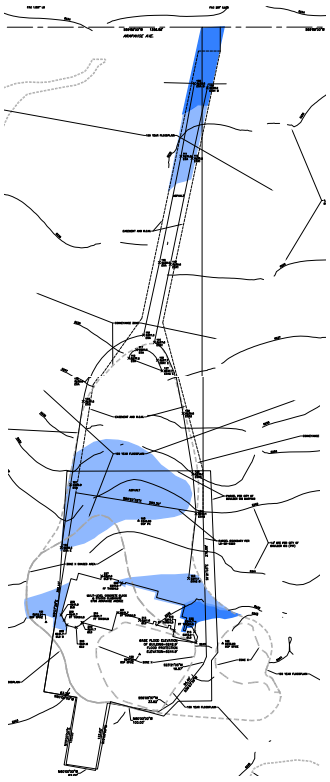
The attached survey shows specific flood elevations and spot grade elevations for the site and building.

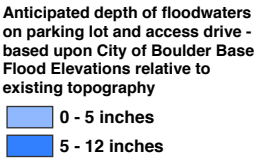
The following Diagram 2shows a simplified analysis of flood depths relative to grade/building elevations. The greatest depth of water against the structure is likely to occur on the east side of the structure where water may be as deep as 12 inches. Lesser depths of water against the structure are possible along the eastern portion of the north elevation. Although the west side of the structure is outside the 100 year flood zone on the maps a closer analysis of grades adjacent to the structure and anticipated BFE indicates that there is a possibility of up to 5 inches of water against the wall at on the west side of the ballroom space.



Flood Diagram 2 - floodwater depth against building walls

Diagram 3 shows that a portion of the parking area may be between 0 and 5 inches below the flood water elevation in a 100 year event. The northern portion of the access road may also be beneath the surface of floodwaters in a 100 year event. Depths vary between 0 and 12 inches with depth increasing as the access road approaches Arapahoe Avenue. This portion of the access road is within the conveyance zone.





Flood Diagram 3 showing floodwater depths on parking lot and access drive.

NFIP Flood Proof Construction

Because the Flatiron Event Center structure is partially within a 100 year flood zone (AE) it is considered as being within a Special Flood Hazard Area (SFHA) and any new construction or substantial modification to the structure, in whole or in part, shall comply with NFIP requirements for Flood Proof Construction as outlined in a series of technical bulletins. Following is a summary of Bulletins applicable to the Flatiron Event Center and its proposed restoration/repair/renovation.

Bulletin 1 - Openings in Foundation Walls and Walls of Enclosures

This section is not applicable as it is concerned with spaces beneath floor systems raised above the BFE. At Flatiron Event Center the habitable floor level is below the BFE with no below floor space.

Bulletin 2 - Flood Damage-Resistant Materials Requirements

NFIP regulations require that for “a proposed building site ... in a flood prone area, all new construction and substantial improvements shall ... (ii) be constructed with materials resistant to flood damage...” Whether an anticipated scope of work at the Flatirons Event Center shall rise to the level of “substantial improvements” shall be at the discretion of the City of Boulder. If this is determined to be the case any repair or new construction shall be made with flood damage-resistant material.

> *“Flood [damage]-resistant material” is defined by the NFIP as “any building product [material, component or system] capable of withstanding direct and prolonged contact with floodwaters without sustaining significant damage.” The term “prolonged contact” means at least 72 hours, and the term “significant damage” means any damage requiring more than cosmetic repair. “Cosmetic repair” includes cleaning, sanitizing, and resurfacing (e.g., sanding, repair of joints, repainting) of the material. The cost of cosmetic repair should also be less than the cost of replacement of affected materials and systems. In addition to these requirements, individual materials that are considered flood damage-resistant must not cause degradation of adjacent materials or the systems of which the material is a part.*

Assessment of existing construction materials and systems at Flatiron Event Center

If the structure is to be renovated to comply with NFIP damage-resistant materials requirements the following building materials must be removed and replaced below the BFE:

Material to be removed	*Replacement material*
paper-faced gypsum wallboard products	*fiberglass-faced gypsum wallboard*
fiberglass batt insulation	*closed cell spray polyurethane foam insulation*
wood entry doors	*hollow metal doors*

We believe the EIFS system on the exterior of the southwest portion of the structure will comply with flood damage-resistant requirements but have not been able to get confirmation on this by FEMA.

The cmu block walls on the exterior of the structure are generally considered to be flood damage-resistant materials because they are relatively impervious to water absorption and they can typically be cleaned. NFIP does however make the distinction that the hollow cell cmu walls at Flatiron may not comply:

> *Unfilled concrete block cells can create a reservoir that can hold water following a flood, which can make the blocks difficult or impossible to clean if the floodwaters are contaminated.*

Cmu walls are susceptible to moisture intrusion where cracking exists in the exterior wall. This is the case in several locations around the perimeter of the Event Center.

Bulletin 3 - Non-Residential Floodproofing - Requirements and Certification

NFIP requires that for buildings within a defined Special Flood Hazard Area (SFHA) new construction or substantial modification shall comply with requirements for and certification of building systems that are watertight and substantially impermeable to flood waters. The following NFIP language has been incorporated into the City of Boulder Code:

> *"Provide that where a non-residential structure is intended to be made watertight below the base flood level, (i) a registered professional engineer or architect shall develop and/or review structural design, specifications, and plans for the construction, and shall certify that the design and methods of construction are in accordance with the accepted standards of practice for meeting the applicable provisions of paragraphs (c)(3)(ii) or (c)(8)(ii) of this section, and (ii) a record of such certificates which includes the specific elevation (in relation to mean sea level) to which such structures are floodproofed shall be maintained with the official designated by the community... "*

As noted earlier, the finish floor of the Flatiron Event Center is approximately 1.3 feet below the BFE for the site adjacent to the structure. Whether an anticipated scope of work at the Flatirons Event Center shall rise to the level of "substantial improvements" shall be at the discretion of the City of Boulder. If this is determined to be the case any repair or new construction shall comply with NFIP Bulletin 3.

We wish to note two issues raised by Bulletin 3 that may affect the repair and/or planning of the Flatiron Event Center. First, Bulletin 3 makes the following statement about facilities planned within a SFHA:

> *Warning Time*
> *The rate-of-rise of floodwaters for the site in question, the established flood warning system (if any), the flood warning time available, and the reliability of the flood warning must be reviewed to determine appropriate floodproof design elements. The rate-of-rise or the flood warning time available through an existing reliable (community-based or regionally based) flood warning system must be adequate to provide sufficient lead time to evacuate a floodprone building when flooding threatens. In addition, sufficient warning time must exist to successfully place floodproofing components, such as removable flood shields or gates, if such components are to be included in the floodproofing design.*

The assessment team knows of no warning system for the South Boulder Creek drainage. The risk related to rate-of-rise and warning times discussed in Bulletin 3 will need to be assessed by the City of Boulder staff for the Flatiron site.

Further Bulletin 3 makes the following statement:

> *Safety and Access*
> *Safe access to a floodproofed building is a critical factor in the determination of whether floodproofing is an appropriate design alternative. In 1987, Colorado State University conducted a study of human stability in flood flow conditions based on the product number of depth of flow multiplied by the floodwater velocity. Results of this study indicated that any floodplain location with a product number of 4 or greater represents a significant hazard to individuals. Floodplain sites with a base flood product number number of 4 or greater (depth in feet multiplied by velocity in feet per second) will create a hazard for anyone attempting to escape from or gain access to the site. Such sites are not generally acceptable for floodproofed buildings, unless modifications are made to the site to reduce the flood hazard.*
>
> *For any floodproofed building, all roads to be used as evacuation routes must remain passable as the floodwaters rise. In addition, all roads that provide access to buildings whose dryfloodproofing components require human intervention must remain passable long enough for the floodproofing components to be installed and for all personnel to safely evacuate the site. For sites with an acceptably low hazard (product number less than 4) that are contiguous to land above the BFE, evacuation and access during times of flooding are generally not critical considerations.*

It is beyond the scope of this assessment to determine the safety of access to and egress from the site but we point it out as a potential critical factor in determining how to proceed with the renovation and/or replacement of the Flatiron Event Center. As noted above, the depth of water crossing the access road near Arapahoe Avenue may be near, at or above one foot in depth. Anecdotal evidence from the September flood also indicates that the portion of Arapahoe Avenue directly north of the site did convey a substantial volume of both water and debris. This portion of the road was closed to vehicular traffic during the flood. Depth and velocity of the water moving across the northern portion of the Flatirons Golf Course and adjacent Arapahoe Avenue could present a significant hazard that may warrant consideration in the decision making process regarding the future of the Event Center.

Bulletin 3 also states that a dry floodproofing scheme for a structure with habitable space below the BFE shall:

1. *Be watertight (i.e., floodwaters must not enter the building envelope):*
   - *The building must be watertight to the floodproof design elevation, which is further defined as being at least the BFE.*
   - *The building's walls must be "substantially impermeable to the passage of water."FEMA has adopted the U.S. Army Corps of Engineers (COE) definition of substantially impermeable from the COE publication "Flood Proofing Regulations." This document states that a substantially impermeable wall "shall not permit the accumulation of more than 4 inches of water depth during a 24-hour period if there were no devices provided for its removal. However, sump pumps shall be required to control this seepage." Floodresistant materials, described in Technical Bulletin 2, "Flood-Resistant Materials Requirements," must be used in all areas where such seepage is likely to occur.*
2. *The building's utilities and sanitary facilities, including heating, air conditioning, electrical, water supply, and sanitary sewage services, must be located above the BFE, completely enclosed within the building's watertight walls, or made watertight and capable of resisting damage during flood conditions.*
3. *All of the building's structural components must be capable of resisting specific flood-related forces... hydrostatic, buoyancy, hydrodynamic and debris impact.*

Additional impacts of Bulletin 3 on the Flatiron Event Center are as follows:

1. Provide a continuous source of electricity to operate any necessary floodproofing components such as the sump pumps at the south terrace. A natural gas or liquid propane generator must be installed to provide emergency electrical power.

2. Provide flood proof doors at all perimeter openings or provide watertight shields to two feet above the BFE at all perimeter openings.
3. Provide watertight perimeter walls around the entire facility. The existing cmu walls may be considered to be effectively watertight. They must be kept free of cracks and penetrations or other sources of leaks. The bottom portion of the EIFS walls on the south and west sides of the facility will need to be renovated to modify typical flashing details providing moisture weep from the wall system. Currently flashing and weep are provided at the bottom of the wall. This detail must be moved to the Flood Protection Elevation and the bottom portion of the wall reclad with a material and installation system that is watertight and free of penetrations.
4. Provide an interior sump and pump system to remove any water seepage that accumulates on the interior of the structure.

Flood Damage

The current assessment occurs in the aftermath of the September 2013 floods. During that event the building suffered some damage from water infiltration. Anecdotal reports by staff of the City of Boulder and Spice of Life indicate that water entered the building beneath the south facing doors that line the terrace on the south side of the structure. It appears that the water entering the building was largely a result of the terrace sump pumps being overwhelmed by rainfall causing the terrace to become a “pond.” There is no evidence that the building was flooded by either storm flow moving across the golf course or ground water rising from below.

Descriptions of the flood damage to the building occur throughout the assessments of the various building systems elsewhere in this report. The vast majority of the damage was minor in nature and primarily affected architectural finish systems. Rather than repeat that information here please refer to the other portions of this report.

The flooding incurred in September 2013 is not new to the structure. Reports by management and staff indicate that the building is susceptible to this type of flooding during short but intense rainfall events and that water damage from these events is a recurring condition. No record of past flood events exists but we have reason to believe that they are frequent enough and costly enough to warrant eliminating the conditions that cause them. The primary condition to be mitigated is the “sumped” terrace on the south side of structure where rainwater that falls on the terrace and rainwater that falls on a substantial portion of the roof is collected in an area with no natural means of drainage. The terrace is surrounded by building walls on the north, east and west sides and by a landscape wall and bermed earth on the south side. All water entering this area must be mechanically pumped out to a release point to the northeast of the structure where gravity flow can then allow the water to drain away. As recommended within the civil portion of this report the pumps should be replaced with new units having double the capacity. In addition, as noted within the discussion of NFIP requirements above, a natural gas or liquid propane generator should be installed to provide emergency power in the event of an electrical failure.

Although the damage the building sustained was not caused by storm flows across the floodplain any substantial renovation of the structure must be in compliance with NFIP requirements because the structure is sited within a SFHA.

PART 2

ASSESSMENT OF STRUCTURE/SITE

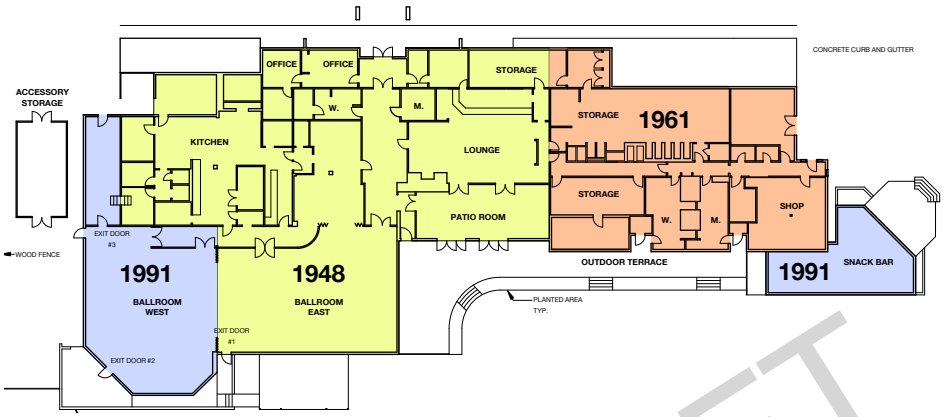
SECTION A

ARCHITECTURE

Overview

The Flatiron Event Center is a 17,400 s.f. single story structure located in the center of the Flatirons Golf Course in east Boulder. The structure is surrounded by the golf course on the east, south and west sides and an asphaltic concrete paved parking lot on the north side.

The building was constructed in a series of phases. The first phase, constructed in 1948 was comprised of the east half of the ballroom, the lounge, the patio room and the kitchen. The second phase, constructed in 1961 added the eastern end of the building. A final phase in 1991 added the western portion of the ballroom.



Flatiron Event Center Floor Plan

Use

Previous

When initially constructed the building was used as a golf club with the following uses: golf pro shop, locker room and facilities for men and women, club lounge, club dining room and related food production facilities.

Current

Currently the structure is leased by the Spice of Life catering company. They have occupied the building for more than a decade.

The western portion of the building has, until recently, been used as a meeting facility with one large meeting room capable of being divided into two smaller spaces and two separate smaller meeting rooms. Kitchen facilities appear to have been expanded slightly over time and occupy the northwest corner of the structure.

The eastern portion of the building contains small, renovated locker room facilities and some support uses – storage and facility shop. The former men's locker room in the eastern portion of the building was until recently used as storage for the catering business leasing the building.

Current Condition versus 2008 Assessment

The building was assessed in 2008 and found to be in extremely poor condition. At that time the report stated that "It (the structure) appears to have reached a point where the cost of operating and maintaining aging building systems may exceed the cost of outright removal and replacement of the outdated systems. Existing building finishes and systems are in many areas non-code compliant, inefficient, extremely costly to maintain and operate and in some instances present outright hazards to the occupants of the structure."

We currently find the building little changed for the better. Some improvements have been made to correct severe issues with building exiting for life safety. Other issues continue to persist and some have worsened.

We noted in 2008 that the roof was emblematic of the problems the structure presented. Years of poor planning and accretion of roof mounted appurtenances had lead to years of poor detailing of roof systems to accommodate these

appurtenances. The result was a roof that suffered from systemic leakage and had become saturated with moisture. This had in turn lead to issues with failing structural sheathing and mold growth that threatened the health and safety of the occupants of the building. Reroofing over the top of the existing roof was and remains a no longer viable alternative. The many layers of accreted roofing materials have worsened the problem by hiding the points of water penetration. In 2008 we stated, “At this point the only responsible and effective solution is to remove the roof system entirely and start anew from the structure on up. This will be extremely costly but will, in the long run, prove to be the better and most economical solution.”

In 2008 the estimated cost to completely rebuild the roof was approximately $300,000. In 2013 we find the structure still trying to make do with the same roof it had in 2008. Ongoing leakage has now become so commonplace that the building owner is forced into an ongoing maintenance contract for the roof just so that the ever present leaks can be addressed quickly. The annual cost of this contract exceeds 20% of the annual lease revenue from the facility. In the five years since the last assessment the owner has paid more than $75,000, one quarter of the 2008 cost to tear off and completely rebuild the roof, to continue band-aiding the failing roof system.

Virtually all of the building systems observed exhibit similar signs of degradation. Many of these other building systems also have conditions, whether from lack of maintenance or simply time and decay, that present real and immediate threats to the life and safety of building occupants.

Architectural Systems

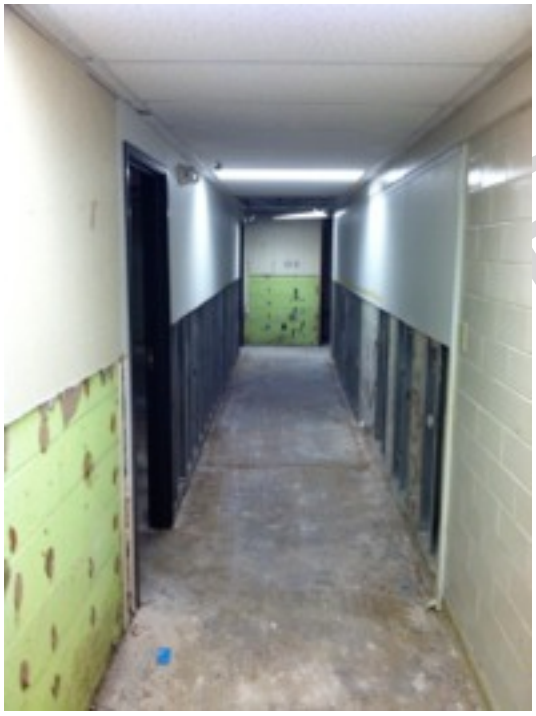
Interior partitions

Many interior partition walls within the eastern portion of the building and some within the western portion are constructed of concrete masonry units. In some locations there are walls built during or after the initial construction but before the city acquired the structure in 1999 that are constructed of light wood framing with gypsum wallboard or other finish material. In recent years new partitions have been constructed of light metal framing with gypsum wallboard finish.

In some instances concrete block partitions have been filled and painted. In others the block has been left unfinished. In still others another finish has been applied over the top of the block - gypsum wallboard, fabric panels and wood paneling are among the other finish systems.

In the western portion of the building interior partitions and their finishes are generally in good condition. In the eastern portion of the building the partitions are generally in poor to fair condition.

Wood and metal framed interior partition walls sustained some damage during the flood event of September 2013. This was most commonly from flood water absorbed by gypsum wallboard. The majority of the walls that have been damaged have been “flood cut.” Drywall material has been cut either 2’-0” or 4’-0” above the floor and removed to allow interior wall cavities to dry out.



Flood cut gypsum wallboard on interior partition framing. Floor finishes removed.

Flood cut interior partition and exterior wall in western portion of the structure.

Cmu interior partition walls appear to have been unaffected by the recent flood event.

The concrete block interior partitions pose several challenges to renovation of the structure:

1. Thermal conductance: where interior concrete block walls connect to the perimeter walls the cmu readily conducts heat energy from the interior of the building to the exterior.
2. Systems integration: integration of new utility services through and within cmu walls is difficult and expensive. As a result, new services (electrical conduit, plumbing piping, etc.) are often run on the

surface of the walls - which can look unsightly and in some instances create conditions that violate ADA requirements. An alternative approach is to fur the wall with new light gauge framing and new finish systems. The new framing provides a void space to conceal and protect the services, new finishes improve the appearance of the wall. This alternative also serves to entomb the asbestos containing material on the cmu block.

Note that the environmental investigation in 2008 determined that the concrete block filler material contained a trace of asbestos. The report from that investigation notes that additional testing will be required to determine if the material contains less than one percent of asbestos. The one percent threshold will affect abatement and containment in the event of total demolition of the structure. If partial demolition is to be undertaken - to enlarge openings or remove walls - abatement will need to occur prior to the demolition work. This will dramatically increase the cost of any work within the building.

Flood Repair
As noted above, flood cut gypsum wallboard will need to be replaced throughout the structure.

Flood proofing
No change to interior partitions is necessary for flood proofing of the structure.

Renovation to code compliance
Interior partitions will need to be changed to accommodate revised opening widths and clearances for ADA clearances at doors. Interior load bearing cmu partitions will need to have face shells cut to receive new vertical reinforcing steel and solid grouting. The top courses of load bearing walls will need to be solid grouted for anchorage of a new roof truss system.

Note that the environmental investigation in 2008 determined that the concrete block filler material contained a trace of asbestos. The report from that investigation notes that additional testing will be required to determine if the material contains less than one percent of asbestos. The one percent threshold will affect abatement and containment in the event of total demolition of the structure. If partial demolition is to be undertaken - to enlarge openings or remove walls - abatement will need to occur prior to the demolition work. This will dramatically increase the cost of any work within the building.

Exterior walls
Exterior walls in the eastern portion of the building are painted cmu block. The block cells are unfilled. This wall system is uninsulated.

Exterior walls in the newer western portion of the building are the following assembly: EIFS (synthetic stucco finish coat over rigid exterior insulation, plywood sheathing, light gauge metal framing with fiberglass batt insulation and an interior finish of painted gypsum wallboard.

The exterior wall systems appear to have been mostly unaffected by the recent flooding. Some new minor cracking has been observed at the cmu walls on the south side of the structure and some new minor cracking has been observed on the interior of exterior wall systems at the southwestern corner of the structure. Some of this cracking may the be result of foundation movement since the previous assessment in 2008. Whether the cracking is the result of foundation movement resulting specifically from the recent flood event cannot be determined. Refer to the structural portion of the report for additional information on the structure of exterior walls.

Metal framed exterior wall systems in the western portion of the building sustained damage on their interior faces as a result of flood water absorbed into gypsum wallboard materials. These materials have been “flood cut” and removed. Fiberglass batt insulation has also been removed.

Although likely unrelated to the recent flood event, where drywall has been removed from the interior face of new metal framed wall systems the plywood sheathing at the bottom of the wall shows a consistent pattern of water staining and

degradation. Mold growth was observed on the surface of the plywood. In some locations the water intrusion has been so persistent as to cause galvanized metal wall track to rust extensively. It is likely that this has resulted from one or both of the following conditions: inadequate vertical separation between bottom of wall systems and top of adjacent grade and/or concrete flatwork, improper flashing and weep termination of the exterior finish system resulting in water being trapped within the wall or storm water being pulled back into the wall at its base. The damage was more extensive on wall surfaces beneath window openings suggesting that the cause may be the result of improper flashing and weeping of the system.

Cmu exterior walls fared well in the recent flood because they are largely impervious to water penetration and because they are made of inorganic materials that do not support mold growth. For these same reasons however, these walls present significant issues for the thermal and energy performance of the structure. These walls have little to no insulating value. Their r-value is likely 2 or less. Current codes would require exterior walls with an r-value of 20 or more. Achieving such a value would require the addition of several inches of continuous foam insulation on the exterior side on the cmu, likely necessitating the construction of an entirely new framed wall to support the insulation system and new exterior finish system.

Flood Repair
As noted above, the cmu perimeter walls fared well during the flood event and will not require repair. Light framed perimeter walls will need to have fiberglass insulation and gypsum wallboard replaced.

Flood proofing
For the insulated walls at the southwest corner of the building compliance with NFIP requirements will necessitate new closed cell polyurethane insulation where fiberglass batts were used previously and fiberglass faced gypsum wallboard on the interior surface. EIFS wall cladding on the exterior may need to be replaced at levels below the BPE so that detailing of weeps can be revised to an elevation above the potential flood level.

Renovation to Code Compliance
Exterior cmu walls will need to be reclad with new framing, insulation and finish systems in order to achieve energy code compliance. Current structural codes will require cutting of face shells of cmu to allow insertion of new vertical steel reinforcement. Cells within top courses of cmu will need to be grouted solid to provide anchorage for a new framed roof.

Roof

Structure
The existing roof is a series of flat/low slope surfaces. On the older eastern portion of the building the structural framing is solid sawn lumber joists with plywood sheathing. The framing appears to be (or to have been) level indicating that the slope on the roof was to be built up as a part of the roofing system. A thorough analysis of the structure of the building is included elsewhere in this report. In this section the discussion of the structure is limited to the observed conditions relative to the structure as a part of the overall roof/weather protection system.

At the time of the previous assessment of the structure in 2008 several locations within the building showed signs of significant and sustained water migration through the membrane and subsequently through the structural sheathing and interior finish systems. In some of these locations the structural sheathing had been so compromised by water migration as to have the adhesives within the plywood fail allowing the individual plys to delaminate and deteriorate. The degraded plywood sheathing remains. In some locations the structural framing and sheathing have been painted white.

Membrane/waterproof course
The existing roof system is a series of flat/low slope roof surfaces currently covered with an APP (Atatic Polypropylene) Modified Bitumen Roof System with an Aluminum Coating (Reflectant). The structure has had a series of roofing materials installed over time.

In 2008 six core tests of the roofing surface were taken at the site. Coring revealed anywhere from a single roof system over the newest portion of the building in the southwest corner to as many as four layers of roof systems over the older

portions of the building. Cores in the older portion of the roof had an original roof layer of Built-up Tar and Gravel Roof. Above this were multiple layers of built-up roofing interspersed with layers of fiberglass insulation. The precise locations of the fiberglass insulation varied between the different samples. The gravel ballast on the original roof was not removed prior to reroofing. The gravel remains and is entombed beneath subsequent layers of roofing. The final (current) roof is smooth modified bitumen.

It is highly likely that the original built-up roof layer contains coal tar and asbestos in the flashings and possibly in the engineered felts. These core samples were not tested for hazardous materials however.

In 2008 much of the roofing material beneath the top most membrane on the older parts of the building was saturated. Material removed during test coring was uniformly wet. The plywood sheathing beneath these test cores was also wet. Because of the saturation it was difficult to discern distinct layers because the older layers had degraded to such an extent as to be reduced to an indistinct black substance.

The roof membrane is extremely compromised in many locations from poor design and detailing, years of inadequate maintenance, continual soaking due to water penetration and repeated application of new membranes over older systems.

Overall view of roof systems from northeast corner of building - 2008.

Overall view of roof systems from northeast corner of building - 2013.

Test core hole in existing roof - 2008.

Test core sample taken from roof - 2008.

In the images above, note the layering of multiple roofing systems accreted over time. The top membrane is the layer visible near the 2" mark on the measuring tape in this view and the oldest roofing is the thick dark band seen near the end of the tape. The oldest roofing is a traditional built up roofing with gravel ballast. A close look will reveal the original gravel in the material. In addition, this layer appears quite dark because it is saturated with moisture.

The roof membrane currently exhibits many signs of stress. Fissures in the membrane are commonplace particularly where flat roof surfaces are flashed onto parapets or other vertical surfaces. Management has stated that roof leaks continue to be systemic. Fissures in the membrane may be just one location for water infiltration.

Fissure in surface of the roofing membrane

Drainage

There is little positive drainage on large portions of the roof. Water ponds on the surface in many locations. At the time of one previous observation, within two days of a snowfall, approximately one half of the roof was beneath standing water. In some locations the water was several inches deep. These problems are particularly acute over the older portions of the building. Many of the areas of most significant water damage on the interior occur beneath these areas of ponding. Any replacement of the roofing system must include a complete reworking to create positive slope to drains or gutters.

Water ponding on roof in 2008.

Water ponding on roof in 2008.

Water ponding on roof in 2013.

Water ponding on roof in 2013.

The roof is intended to drain to internal drains in some locations and over the edge of the roof into external gutters in others. There is little logic to the system. There are a number of locations where the water collected in gutters is run through downspouts to roof drains and others where water collected in downspouts is run to other lower gutters or collector heads. In many instances the downspouts run flat on the lower roof surface or even up and down through other equipment and utilities arrayed across the roof. Currently most of the downspouts are damaged, crushed and/or separated at joints. The joints between adjacent sections of downspout are taped with aluminum (non-watertight) tape.

Downspout from upper roof run across lower roof in 2008.

Condition of downspouts from upper roof - 2103.

Roof drains over the older portions of the building do not have proper drain bodies or debris screens. In several locations the roof drains appear simply as a hole in the membrane. None of the roof drains has an accompanying overflow drain in the event of blockage of the primary drain.

Downspout from upper roof discharging into roof drain on lower roof. The drain is almost unrecognizable as multiple layers of re-roofing has covered over the drain body and intake. This condition remains unchanged in 2013

Downspout discharging above roof drain (hole in roof membrane). Note the drain opening is clogged with leaf litter and debris likely causing water intrusion and leakage. 2013.

Accessory systems

The roof of the building is populated with numerous elements serving other building systems. These include skylights, mechanical equipment (evaporative cooling units, air conditioning units, exhaust fans, ductwork, venting), mechanical and plumbing piping (gas piping) and electrical equipment (primary power conduit, electrical power serving mechanical equipment, low voltage control wiring, telecommunications wiring.) Many of these elements have been installed haphazardly rather than in an organized fashion.

Among the conditions of concern observed are the following:

1. Improper support of utility services.
2. Many of the electrical and mechanical services on the roof are not properly supported. In many places electrical conduit has little or no support. This is a code violation. The primary gas pipe to the grill is

supported for a considerable length by resting directly on other piping or conduit. This is a code violation. The majority of the electrical conduit and mechanical piping running across the roof is supported on wood blocks resting on the roof membrane. These support points are not anchored to the structure, allowing the supported conduit or piping to be moved. This can cause mechanical joints in the conduit or piping to open and allow water penetration. In many locations the conduit or piping is not secured to the wood block and in several the wood block is secured to the pipe or conduit but is suspended above the roof surface. In some instances the wood blocks have deteriorated to such an extent they are beginning to crumble.

Gas supply piping run over roof surface supported on discarded roofing material bucket - 2008.

Unsupported electrical conduit - 2013.

Improper penetrations of roof surface.

The number of issues of this type are too numerous to list in their entirety here. The most common are as follows:

1. Electrical junction boxes occurring at the point of penetration through the roof surface. Over time as the roof has been repaired and new roofing materials added these units have been covered by roofing material rather than being elevated with proper penetrations through pitch pocket with flashing and counter flashing.
2. Low voltage wiring stubbed directly through roof surface. In several locations low voltage wiring passes through the roof membrane with no detail to accommodate sealing of the roofing material. In at least one location this type of penetration occurs in an area where water ponds on the roof surface.
3. Horizontal penetrations. All elements should pass through the roof surface in a vertical direction to allow flashing and counterflashing of the penetration. Several conditions of elements penetrating the roof in a horizontal or near horizontal fashion were observed. These penetrations can never be adequately waterproofed.

Unable to discern whether this is an electrical junction box or a pitch pocket. The electrical conduit leaving the box is impossible to make watertight.

Multiple roof penetrations with no discernable flashing.

Electrical junction box at roof surface creates a crevice beneath it that is impossible to make permanently watertight.

Electrical conduit exiting horizontally beneath mechanical equipment

Flashing and counterflashing

Roof penetrations and terminations appear to not have any special flashing compounds. The primary roof material has simply been applied to the sides (and tops in some instances) of the elements penetrating the surface of the roof. No counterflashing was observed.

Other issues

1. Exhaust fan from kitchen hood discharges onto roof surfaces. Resulting grease and chemical build up on the roof material is degrading the roof and will lead to the early failure of the material.
2. The roof is cleaner than during the previous inspection in 2008 but unused and discarded mechanical units, miscellaneous roofing materials, abandoned wire and conduit remain. A fire extinguisher sits on the roof adjacent to one mechanical unit.
3. Golf balls. Several golf balls were observed on the roof. This is to be expected given the location of the structure. Given their size, shape, mass and the velocity with which they strike the roof, golf balls seriously damage the roof. They can strike the roof with the impact of a forcefully swung hammer and can cause equivalent damage. It is impossible to prevent golf balls from striking the roof. The roofing system must be designed to mitigate their damage. The roofing may be a system capable of absorbing and deflecting the impact directly or it may have a protection or wear course, separate from the waterproof course that can absorb or deflect the energy without transferring it to the waterproof layer.

Electrical service disconnect switch mounted on deteriorated oriented strand board panel. It appears that the electrical service is supporting the board at this point in time rather than vice versa. 2013.

The condition of the roof appears little changed over the past five years. Virtually all problem areas highlighted in the 2008 assessment persist today. Reports by city staff indicate that water penetration issues remain systemic and ongoing. Information provided by staff show that the facility incurs a significant ongoing cost to continue to band-aid the roofing system and attempt to prolong its life. As of this writing, annual roof membrane maintenance costs exceed 20 percent of the annual revenue generated at the facility.

Recommendation

In the 2008 assessment of the structure it was noted that the condition of the roofing system was extremely poor. It was recommended that a large portion of the roofing system should be replaced in its entirety. That recommendation still stands. The condition of the roof continues to deteriorate and at some point in the future it will threaten the viability of the structure and the life safety of any occupants.

Flood Repair
Although neither staff nor tenants reported roof leakage during the September flood event it is likely, given the history and condition of the roofing system that some leakage occurred. The roof membrane is covered by an ongoing maintenance contract however so any repairs necessary should be dealt with by the roofing contractor separate from the actual flood repair.

Floodproofing
Not applicable

Renovation to Code Compliance
The building code no longer allows installation of new roofing systems directly over the top of old systems in the condition and quantity of those at the Flatirons Event Center. As a result any re-roofing of the structure will require complete reconstruction of the roof system including sheathing. Removal of existing roofing systems will require hazardous materials abatement because of asbestos containing coal tars in the base coat of roofing and Transite ceiling panels (see section on ceilings below.) Given the shortcomings of the existing roof system in terms of drainage, thermal performance and mechanical systems it may be most cost effective to remove the entire roof structure and install a new truss system capable of providing adequate slope, depth for required insulation systems and interstitial/attic space for ductwork within conditioned space inside the thermal envelope. As part of this renovation all mechanical and electrical systems will need to be replaced.

Ceiling systems
Ceilings in the eastern portion of the building are mostly acoustic tiles on suspended aluminum grid. In many locations the tiles are badly stained and warped due to water leakage from above. Some glued ceiling tiles in the eastern portion of the building tested positive as containing a trace of asbestos.

Throughout the eastern portion of the building above the suspended ceiling and nailed to the underside of the roof rafters are transite panels. These asbestos-cement panels - original to the structure - were intended to to provide fire protection to the combustible roof framing. Although the Transite panels were not tested as part of the environmental analysis undertaken in 2008 they are assumed to be asbestos containing materials. Typically this material is composed of 12% - 50% Chrysotile fibers. The asbestos fibers in this material represent a significant health risk to occupants of the structure. The material should be entombed so that it cannot in anyway be accessed or it should be removed.

Alarmingly it appears that continued alteration to the structure has resulted in striking, impaling and drilling of the transite panels in at least two locations in the eastern portion of the building. In the former mens' locker room new fire protection piping has been installed. Anchors for this suspended piping have been drilled or impaled into the Transite panels. In the former womens' locker room a new corridor has been created through the space. New light gauge metal framing, electrical conduit and suspended ceiling grid have been screwed, nailed or pinned to the Transite panels. It is likely that these actions released asbestos fibers into the air. It is highly recommended that this asbestos containing material be removed from the structure to prevent further health risk.

New suspended ceiling grid and electrical conduit attached to Transite panels containing highly friable asbestos. This scope of work has been completed since the 2008 assessment.

Ceiling panels within ballroom space - 2013.

Ceilings in the western portion of the building are acoustic tiles on suspended aluminum grid and gypsum wallboard. The acoustic tiles in the ballroom are in better condition than those in the eastern portion of the building primarily because there has been less roof leakage in this area. The ceiling panels here still show signs of sagging, likely the result of extreme age, and should be replaced. Ceiling tiles in the entry area tested positive as containing a trace of asbestos. These tiles should replaced.

Gypsum wallboard ceilings in the entry hall, lounge, patio room and the eastern half of the ballroom have an acoustic texture - “popcorn” - that contains asbestos. In some areas this material has been covered over by suspended aluminum grid and ceiling tiles. It appears that the popcorn texture has been removed from the gypsum wallboard on the ceiling immediately inside the entry vestibule. Traces of the texture remain around an emergency light fixture and at the margins of the ceiling above the walls. We do not have photo documentation of this ceiling area from the 2008 assessment and so are unable to ascertain whether this material was removed within the last five years or sometime prior to that. Regardless of the timing it is important that proper abatement of the asbestos containing materials be completed before any further modification to these ceiling areas occurs.

Flood Repair

Although neither staff nor tenants reported roof leakage during the September flood event it is likely, given the history and condition of the roofing system that some leakage occurred. Ceilings may have sustained a small amount of additional damage - particularly in the eastern portion of the building - but ceilings in this area are already in such poor condition that any further damage would likely go unnoticed.

Floodproofing

Not applicable

Renovation to Code Compliance

As part of other revisions necessary to bring the building into code compliance it is probably necessary to remove asbestos containing ceiling materials and install new ceiling finishes after MEP and structural roof systems have been replaced.

Flooring systems

The structural floor system is concrete slab on grade throughout the entire facility. Various finishes have been applied to the concrete in different portions of the building. Most of the floors in the building were covered with a glue down carpet. There is some ceramic tile flooring in the entry hall. Kitchen spaces have sheet flooring, flooring tile and exposed concrete.

In a number of places throughout the facility concrete slabs have cracked, settled and moved differentially creating offsets between adjacent portions of the floor. Examples of this can be found on the extreme eastern end of the structure in the old pro shop space and throughout the kitchen. In the kitchen some of the offsets are extreme to the point of becoming trip hazards.

All carpet was removed after the September flood event due to saturation with storm water.

Removal of carpet has revealed that a large portion of the original flooring throughout the entire pre-1980 portion of the building are 9x9 tiles containing asbestos. 9x9 tiles exist in the following spaces: east side of the ballroom, ancillary spaces north of the east side of the ballroom, hall between ballroom and kitchen spaces, lounge space, old mens' locker room. The environmental report of 2008 listed approximately 350 s.f. of asbestos containing floor tile. We currently believe the approximate area of the asbestos containing floor tiles to be in excess of 4000 s.f. The removal of the glue down carpet has cracked and broken the older floor tiles in a number of areas. Although the asbestos within these flooring tiles is considered to be generally non-friable there is a small chance that the removal of the carpet released a small amount of asbestos fiber into the atmosphere. Areas with broken and fractured tile include: the storage space to the north of the corridor between the kitchen and the entry, the perimeter of the east side of the ballroom. It is recommended that all loose, cracked and broken 9x9 tile be properly abated immediately to reduce further potential exposure to asbestos fibers.

Asbestos containing sheet flooring in kitchen spaces. Continued deterioration along edged between 2008 and 2013.

Sheet flooring in the kitchen - in multiple colors - is also an asbestos containing material. The edges of this flooring continue to degrade through erosion, cracking and breaking. As with the floor tile discussed above, the asbestos within this material is considered to be generally non-friable but there is a small chance that continued degradation of the edges of this sheet product could release a small amount of asbestos fiber into the air.

Flood Repair
Immediately remove all damaged 9x9 asbestos containing floor tile. Patch floors as necessary and overlay with new carpet to cover and entomb asbestos tile. Install new vinyl base along all walls.

Floodproofing
Not applicable

Renovation to Code Compliance
There are places within the structure - particularly in the kitchen - that offsets in the floor level exceed the maximum 1/4" allowed by accessibility codes. In some areas the concrete slab can be skimmed and/or patched to bring the floor surface into compliance. In the kitchen and restrooms (where plumbing fixtures are likely to be moved as a result of ADA clearances) the concrete slab should be removed and, after installation of new below slab plumbing, replaced.

Fenestration systems
Windows
Existing windows in the older portion of the building are single glazed steel frame and sash. Many of these windows have been painted over and many are inoperable. The glazing material on these windows has tested positive as containing a trace of asbestos. The thermal performance of these windows is extremely poor. They are not thermally broken, conduct heat readily, do not close tightly and are not weatherstripped. Although these windows are tough and likely to not degrade any further they should be replaced to improve energy performance.

Existing windows in the western portion of the ballroom are aluminum framed with insulated glass panels.

Flood Repair
Not applicable.

Flood Proofing
Some flood proofing of window openings along the south side of the building will be necessary. The existing slab of the structure is at 5241.6 feet. The flood protection elevation of the structure (FPE) is 5244.9 feet. Any window sill less than 3.3 feet above the floor (5244.9 - 5341.6) will need to be flood proofed. This includes windows in the patio room on the south side of the structure adjacent to the terrace and some windows in the ballroom.

Renovation to Code Compliance
As part of other revisions necessary to bring the building into code compliance it will be necessary to remove and replace all windows with new thermally broken aluminum or fiberglass windows, dual glazed with a LoE coating and appropriate tempering at all locations required by code.

Doors
Existing doors within the facility are a multitude of sizes, types and materials. Most are in fair to poor condition.

Most exterior doors are hollow metal in hollow metal frames. The front entry doors are wood. Most interior doors are wood in metal frames.

There are numerous accessibility shortcomings with most of the existing doors in the structure. Rather than enumerate each door and its shortcomings we refer you to an ADA assessment of the structure completed by Recreational Accessibility Consultants in 2012.

Broadly, the following accessibility shortcomings exist:

1. There are many 30" and 32" doors throughout the facility. The original portions of the structure are old enough that they predate the period when 36" wide doors became the standard for commercial applications.

2. The vast majority of doors have non-compliant knobs. A small number of the newest doors have lever operators.
3. Doors within the facility that have automatic closers tend to close too quickly and with too much force.
4. None of the entry/exit doors have code compliant thresholds.
5. Most doors do not have adequate clear space adjacent to strike sides for accessible operation.

Thermal performance of most of the exterior doors is extremely poor. Several doors are ill fitting. The patio room doors in particular do not close cleanly or tightly. The western set of these doors does not seem to be able to fully close and seal. Metal doors and frames are not thermally broken. Few doors have sweeps or proper weatherstripping at jambs, head and threshold. It was observed during the cold snap early in December that several doors had towels or other cloth placed at the foot of the door in an attempt to reduce heat loss beneath the door.

Flood Repair

The doors on the south side of the patio room should be replaced. It was beneath these doors that most of the water entered the structure during the September flood event. These doors do not close well and have large gaps contributing to infiltration losses.

Flood Proofing

Flood proofing of all door openings within perimeter walls will necessary regardless of location, orientation or the adjacent BFE. Existing doors must be removed and replaced with new flood proof doors or new flood gates must be installed in front of all existing openings. If new doors are to be installed they must be 36” in width. This may necessitate removal of existing frames and enlarging the opening in the cmu wall. Door openings may need to repositioned within the wall in order to create the required clearances for accessibility. Asbestos in cmu block filler may require abatement prior to cutting cmu.

Renovation to Code Compliance

To bring the building into code compliance it will be necessary to remove and replace virtually every door within the facility. Many doors will need to be replaced with larger units and repositioned within walls to create accessible clearances. New doors and frames will be thermally broken metal with ADA compliant thresholds and hardware.

Life Safety

Building Exiting

The 2008 assessment of the structure highlighted several conditions that represented life safety hazards. Exiting from the structure had several conditions that would not meet building code mandated minimums. Some of these conditions have been addressed and resolved but some remain. The remaining conditions, noted below, continue to represent a significant risk to the health and safety of building occupants in the event of a need to evacuate the structure due to a fire or other catastrophic event.

1. Exiting from the ballroom space
2. Exiting from spaces in the eastern portion of the building

Exiting from the ballroom space

The ballroom (here considered as a single space) is served by three exit doors providing egress to the exterior. The doors are on the south and west side of the space. Exiting from the eastern portion of the space is via an entry corridor that provides access to the parking lot at the front of the building. Although this is not a rated corridor it is sprinkled and provides good at-grade access to the parking area.

The exit doors on the south and west side of the building open into an outdoor space constrained by site walls and/or fences. Each exit still has compromising factors that limit the ability of persons exiting the structure to immediately and directly move away from the structure to a safe distance.

The exit door on the south side of the ballroom opens into a small space bounded on the east by a landscape timber retaining wall and a new concrete stair to grade, on the west by the building and on the south by a masonry retaining

wall. Previously this exit did not have any at-grade egress without climbing over the landscape timber wall. A new concrete stair has been constructed but the stair dimensions are not code compliant. The depth of the landing at the bottom of the stair is deficient and the landing is not at grade but approximately two inches above it. The landing depth must be a minimum of 44” in the direction of travel. The two inch vertical dimension of the step onto the landing is less than the 4” minimum for a step. A sloped concrete surface (ramp) should make the transition from grade to the landing elevation. In addition, the stair does not have its required handrail.

Non-compliant stair to grade outside south door in ballroom. Depth of landing at bottom of stair too shallow. 2” offset between landing and concrete flatwork path at interior floor elevation. No handrail.

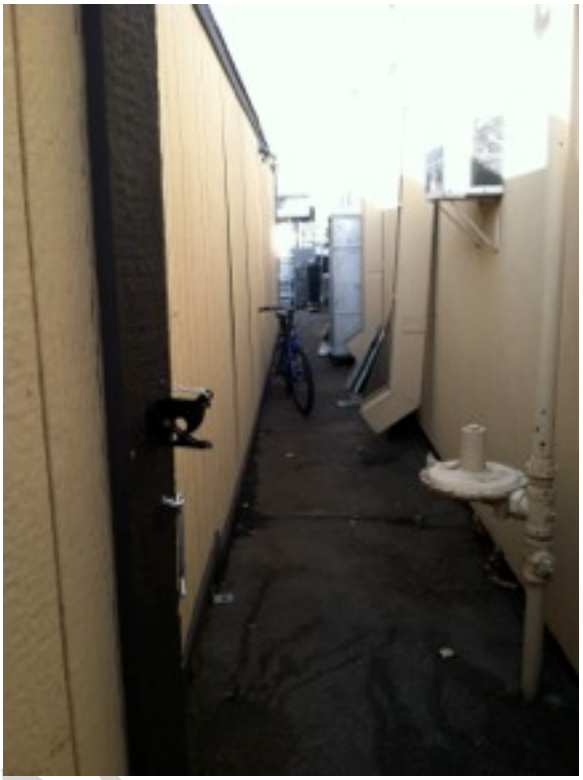
The west and southwest exit doors open into a space bounded by the masonry retaining wall on the south and wood fence on the west. An at grade exit path exists between the west wall of the building and an accessory structure. The space between the two structures is approximately 5’-0”. At the time of the observation for both the 2008 report and this report a number of food service carts and other equipment were stored in this space effectively blocking passage through it. Should this passage be blocked or should the accessory structure be on fire (it does not appear to be protected by the building’s fire suppression system) occupants exiting through these doors will be required to climb over the retaining wall and/or fence.

Southwest exit door behind site wall blocking path to public way.

West exit door opens onto space enclosed by fence and accessory structure, egress path obstructed by equipment stored in space between building and accessory structure.

Accessory structure has been moved farther to the south between 2008 and 2013. The structure now blocks the egress path from the west exit door. Equipment and materials stored between Event Center and accessory structure obstruct egress width. 2013.

Narrow egress path from southwest and west exit doors constrained by building wall and accessory structure, path obstructed by equipment stored by building tenant. 2008.



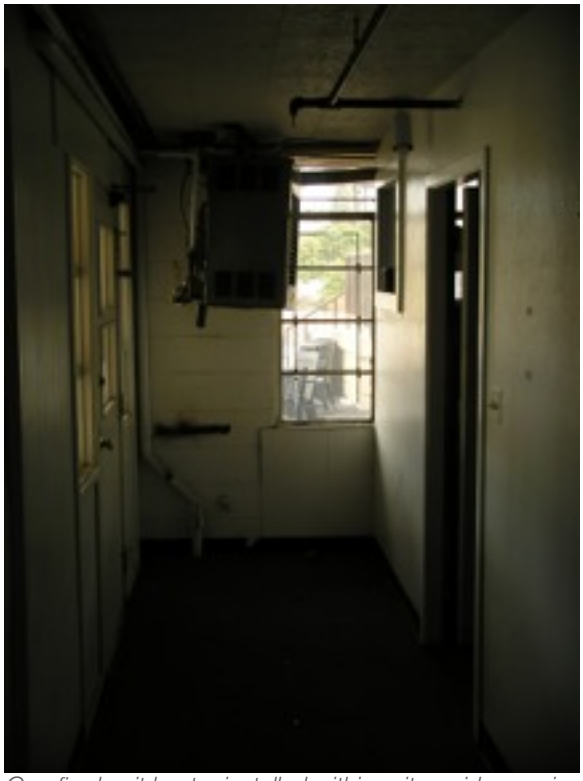
Egress path between Event Center and accessory structure obstructed by food carts bicycle and other items. 2013.

The space outside these doors should have a uniformly paved surface and a portion of the fence on the west side should be removed to allow occupants to move away from the structure. In addition, it is recommended that nothing be stored within the narrow space between the primary structure and the accessory structure to the west.

Exiting from the eastern portion of the building

A single corridor leads from the spaces on the east side of the building to an exit door on the east elevation. This corridor serves approximately 4775 s.f. of building area comprised of several spaces. The majorities of these spaces are used for toilet facilities, storage or are currently unused.

This exit path and exit door are compromised by a unit heater suspended from the ceiling of the corridor immediately adjacent to the exit door. The unit heater is supplied with natural gas via exposed piping within the exit corridor. This heater and its fuel supply are an extreme hazard to occupants needing to exit from the structure.



Gas-fired unit heater installed within exit corridor serving the east side of the building.

Gas-fired unit heater.

The unit heater, along with all associated piping must be removed from the exit corridor. If additional heat is required for spaces on the east side of the building the existing unit could be moved into the storage space immediately to the south of the corridor or it could be replaced with a series of small, electrically powered split system heat pumps for each space.

Flood Repair
Not applicable.

Floodproofing
Not applicable.

Renovation to code compliance
Exiting and life safety systems will need to be completely overhauled as part of renovating the structure to bring it into code compliance. Revisions include:

1. Rated corridors with rated openings
2. Accessible exit path with required corridor and door widths
3. Revisions to the fire protection system
4. Revisions to the fire alarm and notification systems
5. Revisions to emergency lighting and signage
6. Revisions to egress doors and hardware

Accessibility
In 2012 the City of Boulder contracted with Recreation Accessibility Consultants, LLC to prepare a report on accessibility issues within the Flatirons Event Center. That report was extensive although it focused almost exclusively on the shortcomings within the spaces in the western half of the structure. Similar issues can be found throughout the entire facility. It is not the intent to duplicate that effort in this report except to note that following are the types of accessibility issues observed existing within the structure:

1. Inadequate clear width at exit paths and along paths of travel

2. Inadequate clear floor area for turning within spaces
3. Inadequate clear width at doors
4. Inadequate clearances adjacent to door openings
5. Inadequate door heights
6. Improper door hardware: latching and closing devices
7. Improper clearances at plumbing fixtures
8. Changes in floor level exceeding 1/4”
9. Portions of floors sloping greater than 2%
10. Improper dimensions on projecting elements between 27” and 80” a.f.f.
11. No warning devices for elements projecting more than 4” from wall between 27” and 80” a.f.f.
12. No warning devices for elements hanging from ceiling less than 80” a.f.f.
13. Improper mounting heights for fixtures and appliances
14. Improper heights and reach ranges
15. Improper clearances beneath countertops
16. Improper or no signage
17. Improper or no sight and hearing impaired fire alarm systems
18. No accessible work stations
19. Improper handrails at stairs

The facility was constructed at a time when accessibility was not required. Even recent renovations to the structure are not code compliant however. There are nearly ten accessibility code violations within the recently renovated mens’ restroom near the front entrance for example.

Flood Repair
Not applicable.

Flood Proofing
Not applicable.

Renovation to Code Compliance
The entire facility will need to be renovated in order to meet current accessibility codes. Creating an accessible kitchen will require a complete redesign and approximately 20% more space than is currently allocated. Creating accessible restrooms for guests from the catering operation and guests on the golf course will require equally extensive redesign. Virtually no portion of the structure could remain unchanged if it were to be made fully accessible.

Environmental hazards
The building contains several environmental health hazards. Environmental analysis in 2008 brought to light numerous instances of hazardous materials within the structure. The primary environmental health hazards of concern are: asbestos, mold and lead.

Asbestos
The 2008 analysis tested numerous samples of many of the materials found throughout the building. A large number of the materials tested positive. Please refer to the analysis and test results attached to this report. The materials containing asbestos are numerous and widespread throughout the structure. We have noted some of the materials throughout other sections of this report in an attempt to highlight the presence of these materials and their effect on the costs of renovation for other seemingly unrelated elements within the building.

Costs of abating the asbestos containing materials will be substantial. In the event that the structure is demolished these materials will need to be properly abated and delivered to a facility licensed to receive them.

Of continued concern here are not just the costs and safety standards for removal and abatement of the materials at the time of demolition, but also the ongoing risk and exposure of the owner, the tenant, the staff and guests using the facility.

1. As has been noted throughout this report the building is currently in a state of disrepair. Continued deferred maintenance will create potential for exposure of building occupants as building systems continue to degrade and fail. It is possible, for instance, for a roof leak to cause a portion of the structure and interior ceiling finish to fail and collapse. There are indications that this has already occurred in the former women's locker room. If such a failure were to occur in one of the areas that has a ceiling with friable asbestos containing materials it could release and disperse asbestos fibers throughout a wide area. At that point costs of clean up, where every surface including all equipment and materials within the affected area would need to be cleaned and tested, would in all likelihood exceed the costs of demolishing and abating the materials. In addition, the facility would be required to remain unoccupied during the cleanup process. Such a closure will expose the owner and tenant of the building to extreme business disruption costs.

2. Also of concern is the exposure of the owner and tenant to the costs of ongoing maintenance in areas where asbestos containing materials are present. Any repair or maintenance of building systems covered by or concealed behind asbestos containing materials or underlain by asbestos containing materials cannot be undertaken until the asbestos containing material is abated and removed.

Failure to properly abate known asbestos containing material opens the owner to future liability in the event of exposure of occupants of the building.

Transite ceiling panels are found throughout the eastern portion of the building. This is an asbestos containing material. Cutting, drilling or striking the material as was required for installation of the visible electrical system elements can result in the dispersal of asbestos fibers into the atmosphere. Note the signs of water migration through the material at panel joints. Also note the signs of corrosion on the metal electrical conduit and junction box.

Carefully consider the potential risks and costs of allowing asbestos containing materials to remain in the structure in locations and conditions that create the opportunity for exposure of occupants of the structure. It may be more cost effective to implement an immediate plan for abatement rather than deferring the abatement to some future demolition date.

It is recommended that an airborne analysis be undertaken to determine whether asbestos fibers have been released into the atmosphere.

Mold

Immediately after the September flood event mold counts within the structure were considerably higher than in outside air. Facility staff removed all wet and damp materials and thoroughly dried all remaining materials to get mold counts down. Given the issues with the roof system and the signs of repeated and systemic leakage it is reasonable to expect that conditions supportive of mold growth and development have existed and will continue to exist within the building.

In 2008 direct observations showed extensive water damage and black mold growth on plywood sheathing in some portions of the the east end of the building. Ceilings in those areas have since been painted white. We are unable to ascertain whether the mold on the wood surfaces was properly remediated prior to painting or if the paint was applied to cover and entomb the mold. Painting these wood surfaces may help limit dispersal of mold spores throughout the facility. It may have an unintended consequence of hastening the deterioration of structural wood elements by effectively sealing the interior face and limiting or preventing moisture vapor transmission. The painted surface will prevent drying to the interior face holding moisture within the wood elements increasing the potential for wood rot and deterioration.

It is possible that the presence of mold is pervasive throughout all areas of the building where there is water trapped beneath the existing roof membrane. This would include the entire eastern portion of the structure, the areas surrounding the main entry to the building and the areas in the northwest corner of the building – primarily the kitchen.

Mold growth was observed on the painted walls in the dishwashing area of the kitchen. In this location large amounts of water vapor generated within the space is supporting the mold growth. Additional exhaust capacity is required to remove the moist air and prevent additional mold growth.

As with asbestos, one concern with mold is the potential release of spores and exposure of building occupants as a result of continued building system degradation and failure. Of additional concern is the potential for release of spores as a result of ongoing maintenance. It is important to note that unlike asbestos containing materials, surfaces supporting mold growth do not need to be disturbed to release the spores into the atmosphere.

Because of the issues with the roof and the widespread existence of conditions favorable to mold growth it may be impossible to remove all of the mold containing materials without nearly complete demolition of the structure.
An intermediate position, short of demolition is to eliminate or remove as many of the conditions required for mold growth as possible. As a first step water intrusion issues must be resolved and eliminated to remove this key component supportive of mold growth. As a second step the owner should consider installation of HEPA filtration systems on all air handling devices to remove both airborne mold spores present within the structure and dust on which mold feeds.

Lead

The age of the building is such that lead may be present in paints used during the first two decades of its existence. This is of particular concern in older portions of the building.

Lead within paint is of concern primarily where it can be ingested or inhaled.

Surfaces with paint that may date from the 1940's through the 1960's should be carefully treated to reduce the possibility for the release of lead particles into the atmosphere. Removal of paint from these surfaces should not be done by sanding. Also of concern is the kitchen area where particles of paint containing lead could find their way into food products to be ingested.

Test paints in older and critical areas for the presence of lead. Where paint containing lead is identified apply a new cover coat of latex based paint to entomb the older material. Where the older material has lost its bond to the underlying substrate carefully remove the paint by chemical or other means to reduce the possibility of creating airborne particulate matter.

SECTION B

STRUCTURAL

As part of the building evaluation team led by WORKSHOP8, Atkinson-Noland & Associates (ANA) has performed an investigation and evaluation of structural components of the Event Center Building at the Flatirons Golf Course in Boulder, Colorado. This portion of the report describes only the investigation of structural elements of the building. Donald Harvey, P.E. of ANA visited the site on November 21 and 22, 2013 and December 3, 2013. A view of the Main (North) Entry at the time of investigation is shown in Figure 1.

Figure 1. View of Main (North) Entry of the Event Center Building.

Observations

Foundation

The foundation appears to be a slab-on-grade throughout the building. The thickness of the slab and the spacing of reinforcing were not determined as part of this investigation. No test pits were created to observe perimeter grade beam conditions. ANA measured the floor levelness profile using a gas level along five lines 25 to 100 ft in length at various locations in both the north-south and east-west directions. A summary of the levelness measurements is shown in Table 1. The locations of the levelness measurements are shown in Figure 2. Floor levelness measurements were also made by ANA during our previous investigation in 2008. The results of the 2008 and 2013 measurements are compared for each of the five lines of measurement in Figure 3.

Location (See Figure 2)	Room	Measurement Direction	Distance	Variation from High Point to Low Point	Maximum Slope
A	East Hallway	East to West	80 ft.	0.5”	0.4” in 5 ft.
B	Ballroom	West to East	100 ft.	1.5”	0.5” in 5 ft.
C	West Ballroom	North to South	40 ft.	0.5”	0.4” in 5 ft.
D	Entry Hallway	South to North	90 ft.	0.9”	0.5” in 5 ft.
E	Women’s Locker Room	South to North	25 ft.	0.5”	0.5” in 5 ft.

Table 1. Relative floor levelness measurements, 2013.

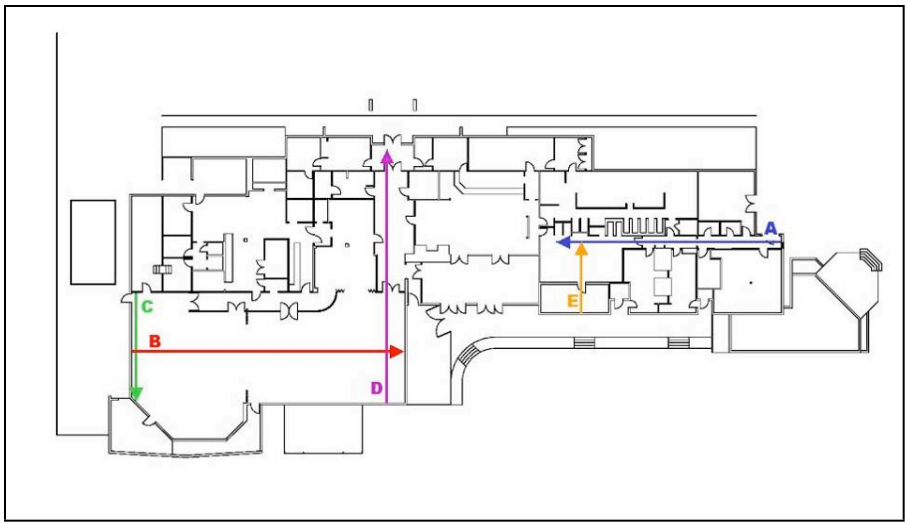


Figure 2. Floor plan of the Event Center Building showing the locations of floor levelness measurements for both 2008 and 2013.

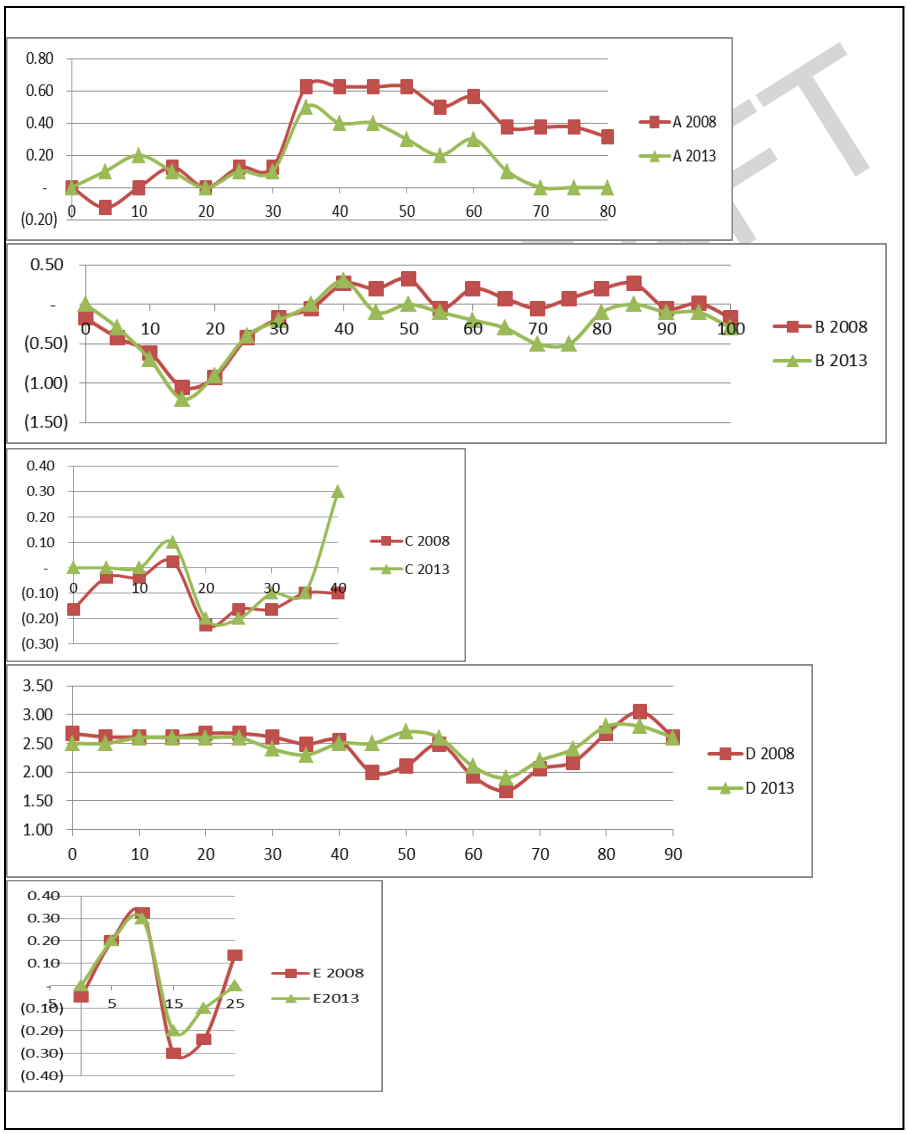


Figure 3. Comparative graphs of relative floor levelness measurements from 2008 and 2013, along paths A, B, C, D, and E. Red lines represent 2008 data and green lines represent 2013 data.

Levelness measurements indicate variations of up to 0.5” in 5 ft and total variations up to 1.5” along a line. These variations are large enough that it is unlikely that they are due to original construction tolerances only. It appears that there has been some post-construction differential vertical movement of the slab.

The comparative graphs shown in Figure 3 generally show fairly minor differences between the elevations measured in 2008 and those measured in 2013. However, there is one notable exception. The measurement at the southwest corner of the building is about 0.4” higher in 2013 than measured in 2008. There is also some significant cracking in the exterior finishes and distress at interior finishes in this area that were not observed in 2008, as shown in Figure 4 through Figure 7.

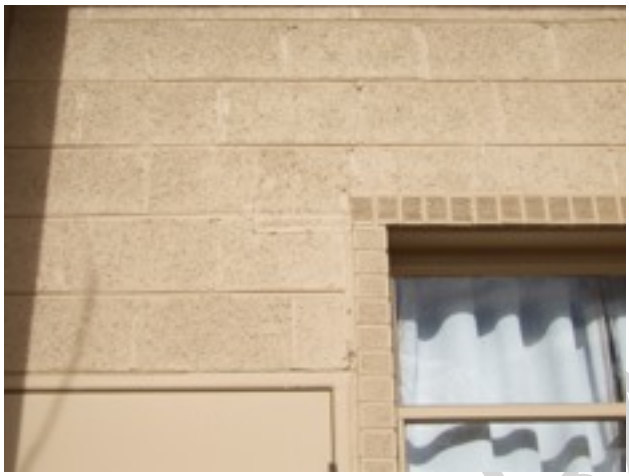


Figure 4. View of stair step cracking in exterior concrete block wall near door and window corners at southwest portion of building. Red dashed line indicates crack location.

Figure 5. View of cracking and displacement at both interior and exterior finishes at a window sill in the southwest portion of the building. Crack location indicated with arrows.

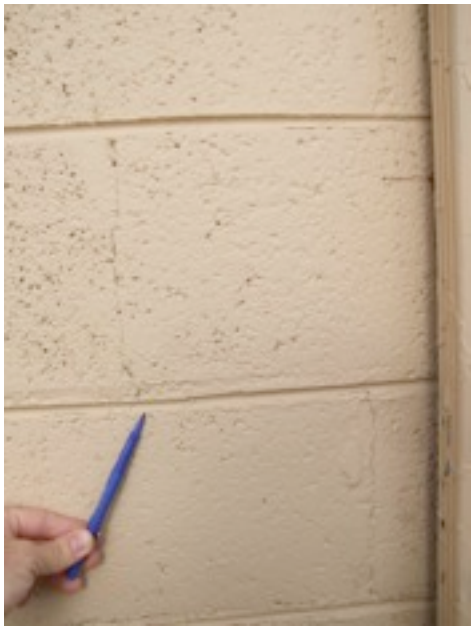


Figure 6. View of stair step cracking in exterior concrete block wall at southwest portion of building.

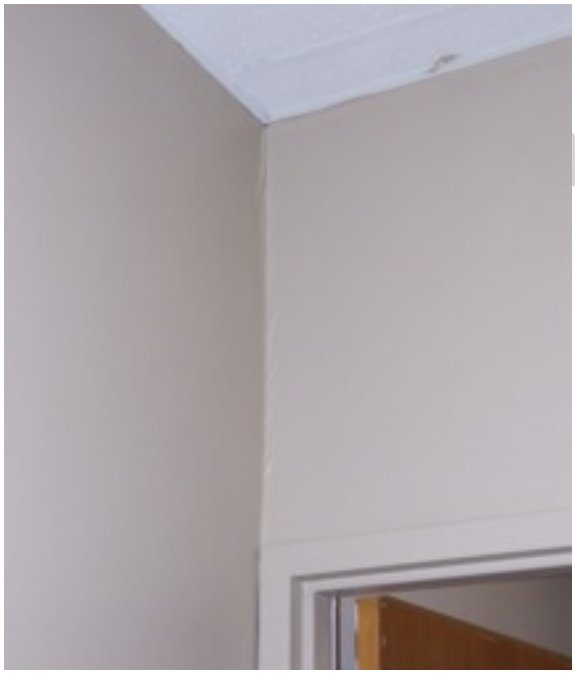


Figure 7. View of wrinkles and cracks at interior paint in corner at southwest portion of building.

ANA observed several stair step cracks in the exterior walls at window and door openings and other locations. This type of cracking is often an indicator of differential foundation movement. Most of the cracking that was not present during the 2008 observations was located near the south and southwest portions of the building. This portion of the building was also reportedly the area where recent flooding affected the building interior and where flood effects were most significant. The cracks observed were typically 0.005 to 0.030 inches wide. It appears that the south and southwest portions of the building experience some differential foundation movement that was likely the result of recent flooding. This movement has led to some cracking at interior and exterior finishes, but it does not pose any imminent hazard to public safety.

Walls

Most of the observed exterior walls appear to be constructed of single-wythe 8 inch-thick nominal concrete masonry units (CMU). There was a limited amount of clay brick masonry observed at the south elevation in the Ballroom area. There was also exterior insulation finishing system (EIFS) present at the west Ballroom Addition and at the west Office Addition.

ANA performed limited metal detection and sounding at the CMU exterior walls to evaluate the existing reinforcing and grouting conditions. We found that the exterior CMU walls appear to generally contain bed joint reinforcing at 16 inches on-center vertically (every other course). There does not typically appear to be any vertical reinforcing or grouted cells in the field of the wall. The minor cracking of walls described in the previous section does not pose any structural hazard. However, since the exterior walls generally consist of single-wythe masonry without an air barrier, even relatively small cracks can have a significant impact on air infiltration and energy performance.

Roof

ANA performed limited observations of the roof construction. Due to concerns about asbestos-containing ceiling materials, ANA only observed the roof structure at existing openings and skylights in order to avoid disturbing ceiling and roofing materials unnecessarily.

There appear to be at least three different roof structural systems within the building. At the center of the building (near the stone fireplace) it appears that the roof structure includes 2×8 nominal dimensional lumber roof joists with 1×6 nominal tongue-and-groove wood plank decking (Figure 8). This is likely the original building roof construction. At the east end of the building including the locker rooms, ANA observed 2×6 and 2×12 dimensional lumber roof joists at 16 inches on-center with approximately ¾ inch-thick plywood roof decking (Figure 9). These areas also generally had approximately ½ inch-thick plywood ceiling sheathing beneath the roof joists and cement board ceiling finish. At the west end of the building, the roof framing in the office addition was observed. This framing consists of 8 inch-deep steel studs at 24 inches on-center with approximately 5/8 inch-thick plywood decking (Figure 10).

Figure 8. View looking through the skylight of roof framing near the stone chimney showing tongue-and-groove planking and dimensional lumber framing.

Figure 9. View of plywood roof decking and wood framing at the east end of the building, showing moisture effects on the plywood. Note that the interior surface has been painted white.

Figure 10. View of metal stud roof framing at the office addition on the west end of the building.

At the majority of the structure, the roof deck stepped down approximately 3 inches near the roof perimeter. However, there was no discernable slope in the roof except at the recent Ballroom and Office Additions at the west end of the building.

The primary roof structural concerns, as expressed in the 2008 report are related to moisture infiltration through the roofing that could lead to rotting and sagging of roof structural elements. It is our understanding that there is ongoing maintenance of the roof that is intended to limit this type of leaking. Additionally, it is our understanding that additional layers of roofing material have been added to the roof in order to reduce leaking since the 2008 observations. At the time of the 2008 observations, several layers of roofing were already present, including some layers of insulation that appeared to remain consistently saturated.

Most roof structures are designed with some reserve capacity for additional layers of roofing. However, this additional capacity is typically limited to a total of 2 or 3 layers of roofing. In addition to the weight of the roofing materials, wet insulation can add significant weight to the roof structure. Since the majority of the roof structure is comprised of wood framing, sustained loads can lead to sagging and creep deflections that will tend to pond water, further exacerbating both the loading and moisture-resistance concerns. It is not advisable from a structural standpoint to continue to add layers of new roofing on top of the existing roofing material. Roofing and insulation should be stripped to the structural deck and replaced in a uniform and coherent manner. This replacement should include new tapered insulation that provides sufficient slope for drainage.

Most of the visibly rotten wood at the building perimeter soffit was repaired or replaced and painted following the 2008 report. It does not appear that there has been significant moisture damage to the wood structure since the 2008 report, likely due to the roofing repairs and maintenance.

Conclusions and Recommendations

Based on our observations and testing, our opinions regarding the distress mechanisms and remedial options are described below:

Foundation

It appears that there has been some differential movement of slab-on-grade foundation. Since the 2008 report, this movement appears to be located primarily at the southwest portion of the building. The existing foundation conditions do not pose an imminent threat to life safety, and these recommendations could be considered a moderate to low structural priority. The following actions are likely solutions to remediate this condition:

1. Improve Drainage – ANA recommends that surface and roof drainage conditions at the north and south elevations be improved in order to stabilize soil moisture conditions. In order to accomplish this, it will likely be necessary to remove and replace pavement along both elevations, add drains and drain lines, and reroute roof runoff. *Estimated Cost provided in separate section.* ***Note that this repair is a direct result of the recent flooding.***
2. Maintain Finishes – Even if the drainage is improved, it is likely that the building will continue to experience differential foundation movement for at least one year after improvements. Minor interior and exterior cracks should be patched and painted as needed for aesthetic, energy, and waterproofing purposes. *Estimated Cost $2000 initially, then $500 per year.* ***Note that this repair is a direct result of the recent flooding.***
3. Piers – ANA does not recommend attempting to install drilled piers or other deep foundations at this building based on the observed levels of distress. Piers would likely be very expensive for a building of this size and layout, and perimeter piers would do little to address interior slab movements. Installation of piers at a small portion of the building could actually lead to increased distress at adjacent areas.

Walls

The observed cracks at exterior walls are not a structural concern. However, it appears that the typical single-wythe CMU exterior walls do not have any grouted cells or vertical reinforcing. ANA did not perform structural analysis on these walls. If the building structure remains unchanged and the building use does not change, it is likely that the building will not be required to meet modern structural requirements. However, if the building structure or use is changed significantly, it is likely that the building would have to meet current building codes. This would likely require strengthening of the exterior walls by adding reinforcing for ductility. Additionally, if there are significant changes to the roof structure, as described in the next section, there will likely need to be improvements to the tops of the walls in order to accommodate new roofing attachment. The following actions could be part of a solution if strengthening is required:

1. Add Vertical Reinforcing – Adding vertical reinforcing and grout to an existing wall typically involves locally removing face shells from the wall and placing reinforcing and grout at the required spacing through these openings. If the top of the wall can be accessed (which would require removal of roofing and roof decking at this building), the reinforcing and grout placement can be simplified. Estimated Cost $40,000-70,000.
2. Grout at Roof Connections – In order to permit the installation of new roof truss anchors into the walls that are adequate to resist uplift in accordance with current Code requirements, the top several courses of masonry at locations where roof anchors will be installed should be grouted and possibly reinforced. This would likely be required only at perimeter connection locations, even if the truss is also supported on interior walls. Similarly, anchors may also be required at the base of some wall areas to resist uplift and overturning. Estimated Cost $50,000.

Roof

ANA did not perform structural analysis of the roof, but by inspection it is unlikely all of the wood-framed roof areas will meet current code snow and rain (ponding) load requirements, especially with the multiple layers of roofing currently in

place. Additionally, it may be necessary to replace the existing roof structure in order to accommodate required changes to the mechanical, electrical, and plumbing systems. The following actions are likely solutions to remediate this condition:

1. Replace Roof Structure (If Necessary) – If required, the roof framing could be replaced for structural reasons or for the accommodation of other systems. The most likely type of replacement roof structure would be open-web prefabricated wood trusses with plywood decking. These trusses would likely have sloped top chords to facilitate drainage. It might also be necessary to add or modify walls, columns, and footings to accommodate the new roof configuration. Estimated Cost $80,000-$100,000.

SECTION C

MEP

Overall Assessment

Overall the building mechanical, electrical, and plumbing systems are in very poor shape. Most of the building systems have been used well beyond their expected life and will likely need to be replaced in the near future. It appears that proper preventative maintenance and repair has not been done, although with the age of some the equipment, this may be irrelevant.

Flood Repair

From an MEP standpoint there is not very much work that needs to be done related to flood repair. There are a few electrical outlets in walls where the drywall has been removed. These areas will need to be repaired. Additionally, some insulation on low hydronic piping was damaged by the flood. This is minimal and is mostly on the north side.

New Mechanical System Options

The current energy codes and the low ceiling / structural space will significantly limit the new system possibilities. One main issue is that the newer energy codes prohibit exterior ductwork for conditioned air. This coupled with the low ceiling / structural space will make a ducted system almost impossible to install. The only system that will likely work for the existing space would be a Variable Refrigerant Flow System. This system would likely have two or three 20 Ton exterior heat pump units with various air terminals located in the space. This system is approximately 2-3 times the cost of a conventional ducted system using packaged roof top units. A rough estimate would be about $400,000 for this building.

New Roof Structure – The cost of the mechanical system would be much less if the roof structure were to be replaced with one that had adequate space to run ducts inside the building. The facility could be served by high efficiency gas fired roof top units. The building would have 6-8 roof top units similar to the ones that exist today, but much more efficient. A rough estimate for this system would be $200,000.

Existing System Evaluation

The various existing systems are described below along with recommendations for proper operation and what is needed to bring the systems up to current codes.

HVAC Systems

RTU-1

1. Area Served –Ballroom.
2. Condition – This unit is in decent shape but is 10-15 years old. It may have a few more years of life, but is certainly nearing the end. The ductwork on the roof is supported by cinderblock directly on the roof, which could lead to roof failure.
3. Code – The unit does not meet the current energy standards. It does not have an economizer or the proper ventilation system. The ductwork on the roof does not meet the current energy standards.

RTU-2,3

1. Area Served - Serves the Lounge & Storage Areas.
2. Condition - These units are very old and in poor shape. These are likely to be the original units and 50+ years old. Much of ductwork serving these areas within the building is in very bad shape and should be replaced.
3. Code – The units do not meet current energy standards and do not have the proper ventilation system. The ductwork routed on the roof does not meet the current energy standards.

RTU-4

1. Area Served – Western Ballroom.
2. Condition – This unit is in decent shape but is 15-20 years old. It may have a few more years of life, but is certainly nearing the end.

3. Code – The unit does not meet the current energy standards. It does not have an economizer or the proper ventilation system. The ductwork on the roof does not meet the current energy standards.

RTU-6

1. Area Served - Patio Room/ Lounge.
2. Condition - This is a relatively new 5 Ton roof top unit that looks to be in good shape and could be operational for 10+ years.
3. Code – The unit does not meet the current energy standards. The ductwork routed on the roof does not meet current energy standards.

RTU-7

1. Area Served – Snack Shop.
2. Condition – This is a relatively new roof top unit that looks to be in good shape and could be operational for 10+ years
3. Code –The ductwork on the roof does not meet the current energy standards.

Grease Hood Exhaust System

1. Condition – These fans are fairly old and not in great shape. Fans are fairly simple pieces of equipment and with some maintenance could last for a few more years, but ultimately need to be replaced. The hood does not appear to be properly sized for the equipment. The hoods are required to overhand the equipment by 6" on all sides, which the current layout does not do.
2. Code – The south fan discharge is directed towards the roof top units serving the ballroom. This fan would need to be redirected up to meet code. The north fan discharged down onto the roof and would need to be raised up above 42" directed upwards to meet code. The disconnect on the north fan does not have a cover. This is a life safety hazard and should be repaired immediately. The hood size and UL listing is likely void, the hood system should be replaced.

Kitchen Make Up Air -

1. Condition – This is a very old evaporative cooler in poor shape.
2. Code – The unit does not have any heat and therefore does not meet current codes. It is not currently interlocked with the exhaust system another code violation. The make-up air unit would need to be replaced with direct fired make up air unit and interlocked with the exhaust fans to meet current code. The unit is also located within 10' of plumbing vent. The vent would need to be raised 2' above the cooler to meet code. The ductwork on the roof does not meet the current energy standards.

Boiler System

1. Condition – This is a very old boiler that at its best was 78% efficient. It is likely operating at less than 60% efficiency. Some of the insulation on the hydronic piping within the building is exposed and has been damaged or fallen off. Some of the hydronic radiant heaters are damaged, but still functional and should be replaced.
2. Code – The boiler does not meet current energy standards for efficiency. The controls wiring is exposed and messy. The boiler room has numerous problems including blocked electrical disconnects, covered combustion air ducts, and missing backflow prevention device. The combustion air intakes are less than the 2' minimum distance above the roof and are within 10' of the boiler flue and another adjacent exhaust discharge. The hydronic pipe insulation will need to be repaired or replaced to meet current energy standards.

Plumbing Systems

Water Piping

1. Backflow – The main cold water service does not have an approved backflow prevention device. This is a code violation and needs to be installed.

2. Insulation – Much of the domestic hot and cold water is not insulated. The hot water would need to be insulated to meet code. The cold water is not required to be insulated in our dry climate.
3. Pipe failures – There are signs of pipe repair that may be due to past frozen pipes.

Sanitary Piping

1. The sanitary pipe system is certainly aging. The Locker room areas have been grouted and sealed. The system should be inspected with a camera to properly evaluate the integrity of the underground lines. They may have corroded over the years.

Fire Sprinkler System

1. This system appears to have been serviced recently and looks to be in decent shape. It was inspected in 2013. This system should be evaluated by a Fire Sprinkler Contractor / Engineer.

Gas Piping System

1. Roof Supports – There are a number of areas on the roof, where the gas piping is not properly supported. The pipe fitting could be stressed and fail. This should be repaired.

Roof Drainage System

1. Roof Gutters – The roof gutters on the higher roof components are run on the surface of the roof to roof drains or to the low roof gutters. Many of these gutters are badly damaged and some are running uphill, which will trap the water in those drains.
2. Roof Drains – Most of the roof drains are missing the grates to prevent clogging. This will make clogging and ponding on the roof more likely.

Kitchen Water Heater

1. Condition – This is an older water heater that at its best was 78% efficient. It is likely operating at less than 70% efficiency.
2. Code – The water heater does not meet current energy standards for efficiency. The hot water pipe is not insulated.

Snack Shop Water Heater

1. Condition – This is an relatively new natural draft water heater in decent shape
2. Code – The water heater does not meet current energy standards for efficiency. The hot water pipes are not fully insulated.

Electrical Systems

Main Electrical Service

1. Condition – The building is served by a 900A service that has been expanded and modified over time. The service is located on the east side of the building in small nook between the snack shop. The electrical gear is aging, but is mostly bussed gutter and switches. Switches can fail, but these are fairly simple fused switches, that could have many more years of life. There is limited space for expansion.
2. Capacity –The current peak demand on the service is 95KVA (264A), so the service is more than adequate for the current use. There is approximately 600A of spare capacity for future changes.
3. Code – The main service equipment does not have 36” clear working space in front of the equipment in many areas.

Sub Distribution

1. Condition – The older main distribution gear inside the building has been backfed by the newer main electrical service. This is a fused switch board and will likely continue to function fine, but it may be difficult to find replacement switches if needed during a remodel. It is recommended that this gear be replaced at the time of any significant remodel.

Electrical Panels

1. Condition – There are a number of very old panel boards in the space that serve as power and lighting distribution panels. Finding new breakers for these old panels is very difficult. It is recommended that these panels be replaced at the time of any significant remodel.
2. Code – The electrical panels in the kitchen and in the west office have equipment and or furniture in front of them, which is a code violation.

Telephone patch panels

1. Condition – There are a number of very old patch panels located throughout the building. It is very common for these panels to be abandoned along wit the wiring in them. It is unknown if these patch panels are currently being used.
2. Code – All abandoned wire must be removed per current codes.

Conduit / Wiring

1. Exposed Wiring – There are a number of areas where there is exposed wiring that is not in conduit. This old wiring should be replaced and installed in flexible conduit if connecting to equipment or hard piped if going to boxes.
2. Conduit on Roof – There are a number of locations where the conduit on the roof is not properly supported. There are also areas where the conduit has pulled away from the j-boxes. This must be fixed as the sagging and broken conduit can be submerged in ponding water.
3. Surface Conduit on Floor – There is exposed conduit on the ground in the north end of the building. This does not meet code and should be removed.
4. Wire in Ductwork – There are a number of areas where low voltage and line voltage wiring is run in ductwork. The line voltage wiring is a code violation and the low voltage wiring must be rated for use in plenums.
5. Low Voltage on Roof – There are numerous low voltage wires running exposed on the roof. This wiring must be run in conduit, since is subject to damage if exposed on the roof.
6. Required Receptacle – The north end of the building has mechanical exhaust fans without a service receptacle within 25'. This is a code violation.

Lighting System

1. Condition – The existing system is a mixture of older fluorescent fixtures, incandescent fixtures, and fluorescent replacement lamps in bare sockets. Overall the system is in fairly bad shape. Some fixtures are coming out of the ceilings or walls.
2. Code –
    a. Energy Efficiency - The existing lighting system does not meet the current energy codes. It would likely require a completely new system with a combination of modern linear fluorescent and LED fixtures. The LED would make sense most in the decorative areas where dimming is needed.
    b. Egress Lighting – The existing exit / egress lighting does not meet the current code requirements. The egress paths will need to be verified and corrected. Exterior egress lights would be required at all discharge locations.

SECTION D

ENERGY

Energy Analysis

Minimum Requirements To Reach Proposed Improvements For Flatirons Events Center

Code

As of January 31st, 2014, new code requirements (the City Of Boulder Proposed 2013 NZE Energy Code) will take effect in the City of Boulder, requiring commercial buildings to exceed the IECC 2012 requirements by 30% (Figure 1). The City of Boulder Planning Department has not yet provided guidance on specific methods to meet the new, considerably stricter code.

Because a performance based energy model of the facility is beyond the scope of this report, the 50% Advanced Energy Design Guide for Small to Medium Office Buildings (AEDG 50%) was used as an approximate prescriptive path for compliance with the new code. The City of Boulder has previously accepted the 30% version of AEDG as a prescriptive method of complying with the Boulder 2007 Energy Code. While some of the specifics may differ slightly with further guidance from the City of Boulder, we believe the differences will be minor enough to not have a significant impact on the conclusions of this report.

Existing Performance and Improvement Required

Figure 2 itemizes various existing building components and the related performance levels needed to approximately meet the proposed 2013 NZE Energy Code shown in Figure 1. Although it is possible for the Flatiron Events Center to be upgraded to meet substantially increased standards, it would require extensive work to virtually every part of the building, nearly without exception. For example, most of the **existing exterior masonry walls lose over 600% more energy than a typical wall designed to meet the current energy code.** The same is true of the ceilings. Insulation values for the exterior envelope must be increased over their current levels by almost nine times to achieve the energy efficiency required by the new code.

To gauge energy use on a broad basis, 2012 utility bills (natural gas and electric) were benchmarked against other similar buildings across the nation. Energy Star's Portfolio Manager was used to create a basic comparison of the Flatiron Event Center to a nationwide database of characteristics and energy use of commercial buildings that have the similar primary use. The resulting "Statement of Energy Performance" (Figure 3) summarizes the excessive energy use of the building. The key metric provided is the EUI (Energy Use Intensity) which is essentially equivalent energy use per square foot. For 2012, this facility used 321 kBtu/ft2 compared to a convention center national median of 49 kBtu/ft2 . For this timeframe, **the Flatirons Events Center used 555% more energy than the average building of comparable size and use.** It is possible that the high intensity usage of the commercial kitchen in the building for off-site catering may skew the numbers upward but we believe this is offset by the fact that a portion of the building (the east end) is underutilized or not used at all. It is a certainty that energy consumption of the structure will increase further if the structure is fully utilized without improvement.

When considering required upgrades to the energy performance of the building envelope strictly from the point of view of flood damage incurred during the flood event of September 2013, little improvement is needed. In terms of energy related building components, the flood water damaged some drywall and insulation on and within the walls of the newest section (southwest corner) of the building. These walls are the only portion of the building that nearly meet the proposed energy standards. Insulation in these damaged areas would only need to be replaced, rather than upgraded to repair the structure and return it to September 1 condition. The energy performance of the masonry walls and slab floors throughout were not affected by the flood water. To return the structure to pre-flood condition they do not need to be repaired or improved.

However, in our professional opinion, taking such minimum action is not advised due to numerous other "building-as-a-system" issues and the impact of such high energy consumption on the larger environment. The performance of the building envelope is interrelated with architectural, structural, mechanical, and electrical systems. When considered in a holistic manner all of these various systems must be designed and considered together as a complete entity. Improvement in the performance of the building envelope will result in cost savings within the mechanical and electrical systems for example. The City of Boulder has set ambitious goals for energy efficiency and limiting the carbon footprint of

the community. As part of the plan to achieve those goals it is highly recommended that the thermal performance of the envelope of this structure be significantly improved.

A full renovation of the existing structure to meet the City of Boulder codes would require removal and replacement of most of the building components and systems. The exterior block walls and the majority of the slab-on-grade foundation can be insulated to achieve necessary thermal performance. This would likely include a “channeled” or “furred” fastening system be attached to the block walls which would then hold continuous insulation and allow for a final exterior cladding. This would need to be designed to integrate properly with windows, doors, and other exterior details. Insulating the perimeter of the existing slab would require careful and complete excavation around the entire building. Continuous rigid insulation could then be installed extending down 24” below grade. It is suggested that the insulation of the exterior wall and the foundation perimeter be of equal thickness to simplify flashing and other protective layers. This suggests R-15 be selected to meet the slab insulation minimum requirement.

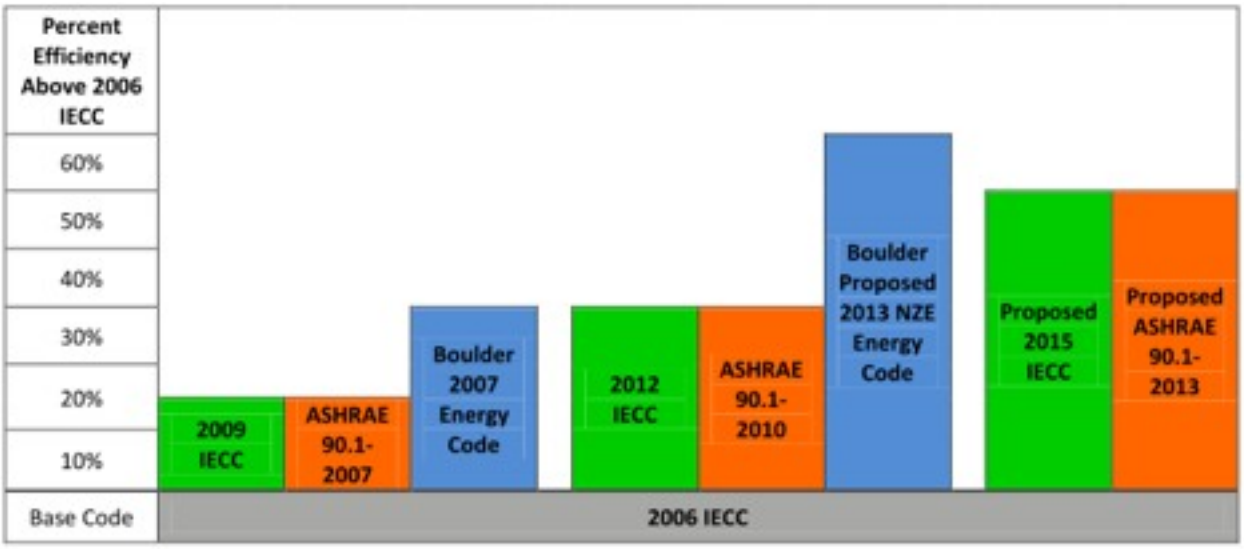


Figure 1.

Building Component	Existing	To meet AEDG 50%
Ceiling / Roof	Poor to ineffective insulation throughout due to gaps, compaction, and damage. Estimated at R-5 or lower performance.	R-30 continuous insulation above flat roof deck. Or R-49 cavity insulation below roof deck.
Walls	8” concrete block walls are extremely low R-value, approximately R-1.5. Framed walls have R-13 cavity insulation and R-6 continuous exterior insulation.	R-13.3 minimum continuous insulation wrap and refinish exterior of masonry walls. Framed walls technically do not meet requirement, but since they are a relatively high performance and not a large portion of the building shell they would likely satisfy a performance path energy model.
Slab	Uninsulated slab-on-grade is very low performance.	R-15 insulation at perimeter of slab-on-grade, extending 24” down into the ground.
Continuous Air Barriers	Numerous air leakage points present, particularly related to the roof assembly, fenestration, wall connections, poorly dampened vents, and interstitial connections.	Dedicated air sealing work practices by all trades completing upgrades. Building leakage testing recommended, not to exceed 0.28 cfm / sf @ 3 in w.g. (75Pa).

Doors	Primarily inefficient metal doors, many without thermal breaks.	U-0.37 insulated swinging doors. R-4.75 roll-up / sliding doors.
Windows	Windows in the older building are very low performance (single pane steel, jalousie), estimated above U-1.2. Newer aluminum windows estimated at U-0.65. Skylight is very low performance, estimated at U-1.3 or worse.	U-factor: 0.35 (non-metal framed), 0.39 (metal framed). SHGC: 0.26 (non-metal framed), 0.38 (metal framed). Skylight: U-0.50, SHGC 0.40
Lighting	Broad mix of lighting fixtures and lamps. Many inefficient lamps, poor lighting controls, poor daylighting features, aging fixtures, and low reflectance of many interior surfaces.	Upgrade to high-efficacy lamps and fixtures, electronic ballasts. 0.75 Watts per ft2 (or lower) lighting power density. Timer, occupancy, or photo sensor lighting controls for auto on / off / step down.
Service Hot Water	The tank water heater is ~0.60 EF, open combustion. This is low efficiency, allowing about 40% of the energy to be lost. Distribution pipes are not insulated overall. An electronic damper is installed, which slightly improves efficiency and safety. *	90% efficient condensing central tank unit or better. 1in to 1.5in insulation on all hot water distribution pipes.
HVAC systems	Boiler is age adjusted to ~47% efficient or lower. Roof top units are ~80% AFUE heating, and 13 SEER or lower for cooling. All are likely operating out of spec, with numerous indicators of deficient maintenance. *	Wide range of system choices, all utilizing high efficiency technology. All existing system components would require upgrade due to integration. See mechanical section for recommendations.
Ventilation / Energy Recovery	Outdoor air ventilation is present, some with controls, some without. Controls and settings are suspect. No energy recovery systems installed.	Range of system choices, including energy recovery and controls integrated with other HVAC components. See mechanical section for recommendations.

Figure 2. (See mechanical section and other report sections for addition information.)

* Combustion safety, carbon monoxide, and air quality for the occupants is an issue that should be addressed. In particular, the open combustion boiler, water heater, and various air pollutants present in the building represent health and life safety risks for occupants. The upgraded building code specification will address these existing issues in a prescriptive way. Gas fueled equipment will be required to be sealed combustion or converted to electric. Air distribution and exhaust systems will be required to be balanced and/or sized correctly for the space use. The building will be tighter and pollutant sources will be controlled. These and other details are part of the overall systems thinking that is fundamental to the design and improvement of higher performance buildings, which in turn use less energy.

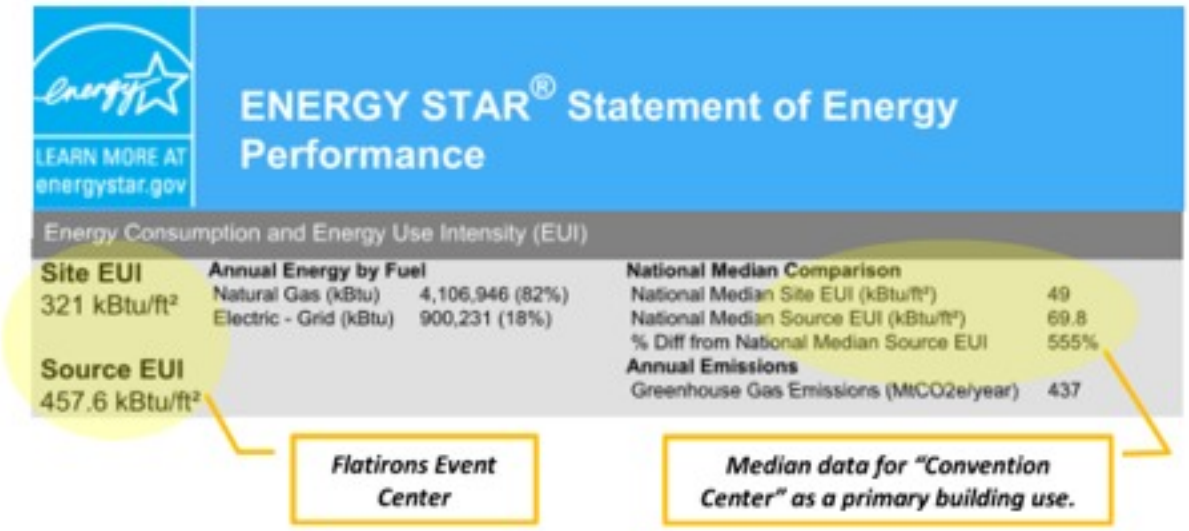


Figure 3.

References:

ASHRAE. 2011. The 50% Advanced Energy Design Guide for Small to Medium Office Buildings, Achieving 50% Energy Savings Toward a Net Zero Energy Building. Atlanta, GA: American Society of Heating, Refrigerating and Air-Conditioning, Inc. www.ashrae.org

ICC. 2011. 2012 International Energy Conservation Code. Club Hills, IL: International Code Council, Inc. www.iccsafe.org

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SECTION E

SITE

Civil Site Overall Assessment

The building generally sits in a sumped condition on the site in that all points around the building are draining towards the building. However, there is a storm drainage system surrounding the majority of the building to capture and convey the runoff to nearby storm systems and ditches.

The drainage on the north side is captured in the curb and flows due east to a storm inlet and piping system. From there the stormwater is piped north and west to the existing ditch along Arapahoe Avenue. The runoff on the south side of the building is captured by a series of area drains which are tied to sump pump that outfalls to the east side of the building where it flows overland to the same inlet that captures the north side runoff.

Roof drainage is conveyed through downspouts which outfall onto the patio and into area drains on the south side of the building, and through sidewalk chase drains into the curb and gutter on the north side of the building. The roof drains on the west side of the building flow overland to the north and west. It is difficult to determine the flow path along the west side of the building due to insufficient fall away from the building. It appears that this side of the building drains slightly north and west.

The water and sanitary services that serve the building appear to be functioning properly and more recently the water system components appear to be improved with a fire hydrant, Fire Department connection, and valves on the north side of the building. It appears that two grease traps serve these facilities, one for the spice of life and the other is for the grill. No recommendations other than regular maintenance will be necessary to keep these utilities in service.
Parking and site as it related to access have been documented in the Flatirons Event Center Accessibility Audit on February 27, 2012 (Audit). This audit revealed several non-compliant issues associated with Parking and Exterior Accessible Routes. Since this document was published, the recommendation for the Parking to bring it up to code were corrected, however, the items listed in the Exterior Accessible Route have not been completed which is detailed later in the report.

Repair of building to September 1 level of finish and operation– Not Applicable to Site

Description/list of damage incurred during September's flood event – Not Applicable to Site
Repair necessary to return structure to a pre-flood condition – Not Applicable to Site

Floodproofing of Building

Required changes to existing systems to floodproof the building to City of Boulder and FEMA/NFIP standards.

The Building is currently located partially in the 100-year flood plain and partially within the 500-year flood plain. The ground floor of the structure is at elevation 5241.6. The Base Flood Elevation at the southeast corner of the structure is 5242.9. Per City of Boulder Code, at it's current location the structure would need to be lifted so that the ground floor was at 5244.9.

Aside from demolishing the building and regrading the site to position the building above the flood plain elevations or installing a site flood wall along the south and west side of the building, the majority of the floodproofing is performed by structural and architectural disciplines. From a civil perspective, calculating the extent or height of the flood above the finish floor to determine the flood protection elevation and to what elevation the building would need to be *watertight with walls substantially impermeable* which equates to maximum of 4 inch depth of water surrounding the building permeating over a 24 hour period.

Any substantial modifications to the building would require that the building is flood proofed per City of Boulder Revised Code 9-3-3. This code is noted below:

1. "Any person making a substantial modification or a substantial improvement to any existing nonresidential structure shall floodproof or elevate the lowest floor, including the basement, of the substantially modified or improved portion to or above the flood protection elevation and shall floodproof the remainder of the existing structure.

2. Such building or structure shall be floodproofed in accordance with any rules for floodproofing promulgated by the city manager pursuant to chapter 1-4, "Rulemaking," B.R.C. 1981, and with current FEMA National Flood Insurance Program (NFIP) Technical Bulletins;
3. Such building or structure shall be floodproofed to the flood protection elevation in such a manner that the building or structure is watertight with walls substantially impermeable to the passage of water and in a manner requiring no human intervention;
4. Such building or structure shall have structural components capable of resisting projected hydrostatic and hydrodynamic loads and the effects of buoyancy; and
5. Such floodproofing shall be certified by a Colorado registered professional engineer or registered architect to comply with this paragraph. Such certifications shall be provided to the city manager as set forth in paragraph 9-3-2(d)(2), B.R.C. 1981."

In addition to these requirements, it is our understanding that the south side patio has suffered repeated flooding. It is reported that this area can flood during rain events when approximately one or more inches falls and during some smaller events when the rain falls over a very short period of time.

Our recommendation would be to rebuild the roof or redirect roof surfaces to drain north and hard pipe the roof drainage to the proposed drainage system on the west and north of the building. The existing pumps should be able to accommodate all water that falls directly upon the terrace. If replacing or re-sloping the roof is not a viable option, the pumps within the sumps in the terrace area would need to be replaced by new pumps with twice the capacity of the existing pumps to help mitigate this flooding. Note, pumping stormwater should be avoided when possible as it is not a sustainable alternative. It relies upon electricity which, as we experienced in September, may not be available during flood events when it is most needed and it requires ongoing maintenance incurring ongoing costs.

Renovation of building to full code compliance

Description of non-code compliant conditions – Parking lot access, roof drainage, and site drainage.

1. Exterior Accessible Route have not been completed include slopes that exceed code, ramps that are not aligned with each other, ramp dimensions and slopes are not code compliant, no curb ramps where one should be, and lack of detectable warnings. No ADA accessibility is provided on the south side of the building.
2. Positive surface drainage measures should be provided and maintained to reduce water infiltration into the foundation. The ground surface surrounding the exterior of the building should be sloped to drain way from the foundation in all directions. The north side of the building is currently equipped to handle minor storms such that the sidewalk and gutter along this side of the building provide a buffer to the drainage heading towards the building from the parking lot, but the stormwater is not moving with much velocity to the south which results in icing and inadequate flow to the south where it enters an inlet and is conveyed up to the ditch near Arapahoe Avenue.

Renovation/replacement of systems to bring structure into full compliance with 2012 codes and City of Boulder requirements

Improvement Site to meet ADA and City of Boulder Compliance:

1. The improvement would include replacing approximately 1,000 square feet of concrete sidewalk on the north side of the building to a max 1.9% cross slope. Please note, ADA allows for a max cross slope of 2.08% but City of Boulder requires that the max cross slope does not exceed 1.9%.
2. Remove and replace 200 linear feet of curb and gutter to accommodate sidewalk and storm drain improvements.
3. Add ramps (a minimum of two curb and one pedestrian) to ADA-code compliant dimensions and slopes to align with surround accessible routes to the buildings main points of entrance on the south and north side of the building. See attached exhibit for pedestrian ramp locations.
4. Install detectable warnings at additional curb ramps.
5. Add approximately three signs around the building to denote accessible routes and entrances on site.
6. The storm drainage system should be extended along the north and west side of the building to accommodate the roof drainage and sumped condition of building. This would include approximately

350 linear feet of storm pipe, 4 field inlets, and approximately 18,000 square feet of asphalt and 500 square feet of concrete removal and replacement to install the storm sewer. This hardscape removal is in addition to the sidewalk improvements. See attached exhibit for limits of disturbance and storm system improvements locations.

Demolition and construction of new facility

Design recommendations from geotechnical reports generally detail the recommended drainage away from building as follows:

"A minimum fall of 12 inches in the first 10 feet in the areas not covered with pavement or concrete slabs, or a minimum of 1.5% and max of 1.9% in the first 10 feet in areas covered with pavement or concrete slabs. Typically, a geotechnical engineer would recommend 3% away from the building in areas covered with pavement or concrete slabs, but the reduced slope would accommodate ADA access as anything over 1.9% cross slope is non-compliant per City of Boulder regulations. In no case, should water be allowed to pond near or adjacent to foundation elements. Furthermore, discharge roof drainage away from the building and where they discharge into pedestrian areas should be directly connected to a storm drain system."

To accommodate this recommendation and ADA accessibility below is a summary of improvements that this could require.

1. 60,000 square feet and roughly 10,000 cubic yards of import to construct a new building at an efficient grade for positive drainage away from the building.
2. The extent of the site improvements would require demolition and replacement of the northern drive aisle and row of parking which is roughly 12,500 square feet to accommodate the proposed grading.
3. A 250 linear foot concrete pan could serve as the conduit in the parking lot to convey drainage to existing storm system or ditches on the north and east side of the site.
4. Approximately 300 linear feet of 8 inch storm pipe and 4 inlets would be utilized to capture and convey the south and west side of the building to the existing drainage ditch on the west side of the site.
5. Approximately 4,000 square feet of 4-inch concrete should be budgeted for concrete sidewalks, ramps, and plaza areas surrounding the building.

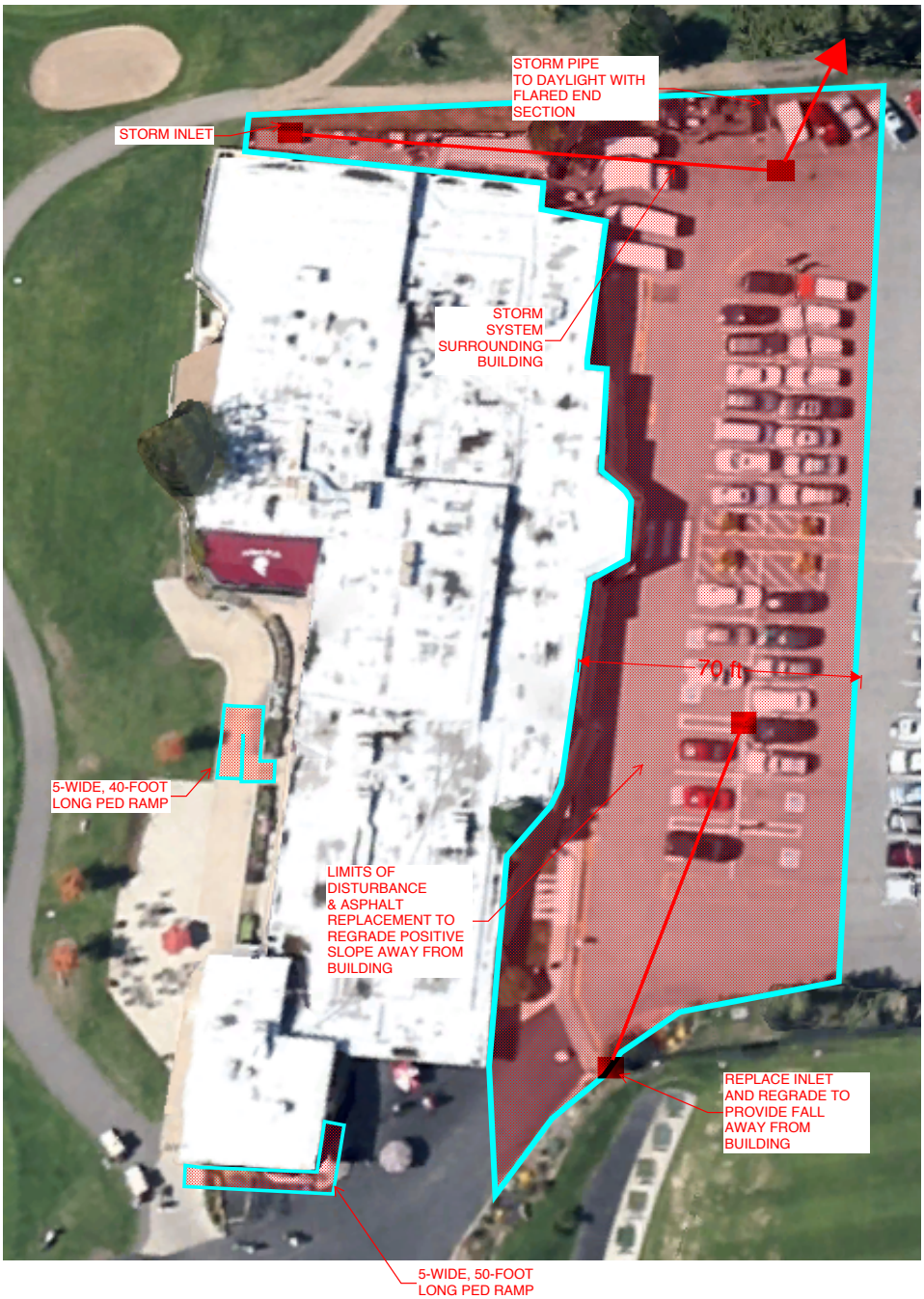

STORM PIPE
TO DAYLIGHT WITH
FLARED END
SECTION
STORM INLET
STORM
SYSTEM
SURROUNDING
BUILDING
70 ft
5-WIDE, 40-FOOT
LONG PED RAMP
LIMITS OF
DISTURBANCE
& ASPHALT
REPLACEMENT TO
REGRADE POSITIVE
SLOPE AWAY FROM
BUILDING
REPLACE INLET
AND REGRADE TO
PROVIDE FALL
AWAY FROM
BUILDING
5-WIDE, 50-FOOT
LONG PED RAMP

Exhibit 1

SECTION F

APPENDICES

Appendices

Environmental Testing

Introduction

On March 4, 2008, Boulder Environmental Management, Inc.'s building inspector, Chris Maron & Mark Symmank, conducted bulk sampling of suspected asbestos-containing materials under the direction of our client.

Sampling:

During the sampling process, suspect ACM was separated into three EPA categories. These categories are thermal system insulation (TSI), surfacing ACM, and miscellaneous ACM. TSI includes all materials used to prevent heat loss or gain or water condensation on mechanical systems. Examples of TSI are pipe coverings, boiler insulation, duct wrap, and mud packed fitting cement. Surfacing ACM includes all ACM that is sprayed, trowelled, or otherwise applied to a surface. These applications are most commonly used in fireproofing, decorative and acoustical applications. Miscellaneous materials include all ACM not listed in the thermal system insulation or surfacing categories, such as linoleum, vinyl asbestos flooring, and ceiling tile.

Boulder Environmental Management, Inc. followed EPA recommended sampling guidelines for identification of asbestos in bulk matrices. A set of three (3), five (5), or seven (7) samples were collected for each material type and analyzed by Polarized Light Microscopy (PLM). Each sample set was systematically analyzed. Upon determination that a sample in a set contained asbestos, analysis of the remaining samples in the set was discontinued. If no asbestos was detected during the analyses, the suspect material was determined to be negative for asbestos content.

Results:
The following materials are presumed to be asbestos containing:

PRESUMED ASBESTOS CONTAINING MATERIALS

MATERIAL	LOCATION
Paper and/or tape	Wrapped around forced air heating ductwork, taped duct seams, wall register boots. *(selective demolition required for verification)*
Boiler, radiant and domestic pipe insulation	Boiler room, and throughout building *(selective demolition required for verification)*
Transite ™ cement board	Ceilings in eastern portion of building
Tar impregnated roofing*	Roof

**Certain non-friable asbestos containing materials such as those noted may remain in a building during demolition as long as OSHA guidelines are followed during demolition*

The following materials were analyzed and determined to be asbestos-containing utilizing polarized light microscopy (PLM).

ASBESTOS-CONTAINING MATERIALS

MATERIAL	SAMPLE LOCATION	SAMPLE ID	ASBESTOS CONTENT
Floor tile and mastic under sheet flooring	Chafer Alley – kitchen swing doors	3-4-CM-01A	10% Chrysotile 3% Chrysotile
Joint compound associated with roll-on textured drywall*	Flatirons Gourmet in ceiling S Flatirons Gourmet in ceiling center Flatirons Gourmet in ceiling center	3-4-CM-07C 3-4-CM-08C 3-4-CM-09C	3% Chrysotile 2% Chrysotile 2% Chrysotile
White pebble pattern sheet flooring	Coffee room	3-4-CM-13E	40% Chrysotile
Orange pebble pattern sheet flooring	Coffee room	3-4-CM-16F	45% Chrysotile
Popcorn acoustical ceiling texture	Front entry hall	3-4-CM-79A	5% Chrysotile
Brown 9” x 9” Floor tile	Front W office	3-4-CM-101G	15% Chrysotile

**The overall composite percentage of asbestos in the drywall system is one percent asbestos or less.*

Regulatory agencies consider drywall and joint compound a finish system that is a composite of both building materials. The two sub-parts, drywall and joint compound are analyzed separately for asbestos. If a sub-part contains asbestos,

then the overall asbestos content of the combined sub-parts is used to determine the hazard classification of drywall and joint compound as a system.

The Environmental Protection Agency and the state of Colorado Department of Public Health and Environment do not regulate drywall and joint compound that have an overall asbestos content of 1% or less. However, Occupational Safety and Health Administration regulations apply to workers handling the material.

The following materials were analyzed and determined to be trace asbestos-containing utilizing polarized light microscopy (PLM).

TRACE ASBESTOS-CONTAINING MATERIALS

MATERIAL	LOCATION	SAMPLE ID
Window caulking	East shop window	3-4-CM-25I**
	East office front window	3-4-CM-26I**
	West office front window	3-4-CM-27I**
Glue daubs associated with ceiling tiles	Old poker room	3-4-CM-61U**
	Old poker room	3-4-CM-62U**
	Old poker room	3-4-CM-63U**
12” x 12” ceiling tile with glue daubs	Old men’s locker room bathroom stall	3-4-CM-70X**
	Old men’s locker room bathroom stall	3-4-CM-71X**
	Old men’s locker room bathroom stall	3-4-CM-72X**
Spongy 2’ x 2’ ceiling tile	Front entry hall	3-4-CM-73Y**
	Front entry hall	3-4-CM-74Y**
	Back entry hall	3-4-CM-75Y**
Block filler (enamel applied to cement masonry units)	Northwest exterior wall	3-4-CM-95E**
	North exterior wall	3-4-CM-96E**
	Interior east hallway - south wall between bathrooms	3-4-CM-106E**
	Interior east hallway hall	3-4-CM-107E**

***Sample contained a trace of asbestos. This material is EPA regulated unless further testing by point count method determines that the sample contains 1% asbestos or less. Trace asbestos containing materials are regulated the same in the state of Colorado as materials that contain greater than one percent asbestos. However, the state allows further analyses by point count method to confirm that a material contains one percent asbestos or less. If the material is confirmed to contain one percent or less, state regulation is diminished, and compliance with the pertaining OSHA regulations is not as cost prohibitive.*

The following materials were analyzed and determined to be non asbestos-containing utilizing polarized light microscopy (PLM).

NON ASBESTOS-CONTAINING MATERIALS

MATERIAL	LOCATION	SAMPLE ID
Orange/red sheet flooring	Chafer Alley (in front of kitchen swinging doors)	3-4-CM-04B 3-4-CM-05B 3-4-CM-06B
Ceiling patch textured drywall joint compound on drywall	Flatirons Gourmet center ceiling	3-4-CM-10D 3-4-CM-11D 3-4-CM-12D
12” x 12” stapled ceiling tile	East workshop	3-4-CM-19G 3-4-CM-20G 3-4-CM-21G
Base cove mastic	East side hallway	3-4-CM-22H 3-4-CM-23H 3-4-CM-24H
Window glazing	East shop window East office front window West office	3-4-CM-28J 3-4-CM-29J 3-4-CM-30J
Stomp textured drywall and drywall joint compound	East hallway at workshop East hallway at workshop East hallway at workshop	3-4-CM-31K 3-4-CM-32K 3-4-CM-33K
12” x 12” ceiling tile	East mop room in hallway East mop room in hallway East mop room in hallway	3-4-CM-34L 3-4-CM-35L 3-4-CM-36L
Glue daub for ceiling tile	East mop room East mop room East mop room	3-4-CM-37M 3-4-CM-38M 3-4-CM-39M
2’ x 4’ pinhole patterned drywall ceiling tile	East men’s bathroom /locker East men’s bathroom /locker East women’s bathroom /locker	3-4-CM-40N 3-4-CM-41N 3-4-CM-42N
2’ x 4’ pock patterned drywall ceiling tile	East side hallway East men’s bathroom/locker Center women’s locker room	3-4-CM-43O 3-4-CM-44O 3-4-CM-45O
2’ x 4’ yellow plastic coated ceiling tile	Old men’s locker room Old men’s locker room Old men’s locker room	3-4-CM-46P 3-4-CM-47P 3-4-CM-48P
Replacement 2’ x 4’ ceiling tile	Sprinkler control valve room Sprinkler control valve room Sprinkler control valve room	3-4-CM-49Q 3-4-CM-50Q 3-4-CM-51Q

NON ASBESTOS-CONTAINING MATERIALS

MATERIAL	LOCATION	SAMPLE ID
Drywall ceiling tile	Shower hall	3-4-CM-52R
	Shower hall	3-4-CM-53R
	Shower hall	3-4-CM-54R
2’ x 4’ lateral striations drywall ceiling tile	Wine locker room west of shower	3-4-CM-55S
	Old poker room	3-4-CM-56S
	Old poker room	3-4-CM-57S
2’ x 4’ post hole patterned drywall ceiling tile	Old poker room	3-4-CM-58T
	Old poker room	3-4-CM-59T
	Old poker room	3-4-CM-60T
Texture on drywall panels	Old poker room south wall	3-4-CM-64V
	Old poker room east wall	3-4-CM-65V
	Old poker room west wall	3-4-CM-66V
12” x 12” ceiling tile	Old men’s locker room	3-4-CM-67W
	Old men’s bathroom stall	3-4-CM-68W
	Old men’s bathroom stall	3-4-CM-69W
Knock down textured drywall and joint compound	Entry hall	3-4-CM-76Z
	Entry hall	3-4-CM-77Z
	Entry hall	3-4-CM-78Z
Drywall and joint compound	West ballroom perimeter	3-4-CM-86B
	West ballroom perimeter	3-4-CM-87B
	West ballroom perimeter	3-4-CM-88B
2’ x 4’ yellow lateral striations drywall ceiling tile	West ballroom	3-4-CM-89C
	West ballroom	3-4-CM-90C
	West ballroom	3-4-CM-91C
Base cove mastic	Kitchen	3-4-CM-92D
	Kitchen	3-4-CM-93D
	Kitchen	3-4-CM-94D
Plaster	Above front hall door	3-4-CM-98F
	Above front hall door	3-4-CM-99F
	Kitchen swinging doors	3-4-CM-100F
	Front office north wall	3-4-CM-104F
	Front office west wall	3-4-CM-105F

Discussion

Sample analyses results are reported in percentages of asbestos and non-asbestos components. The EPA defines any material that contains greater than one percent (1%) asbestos, utilizing PLM, as being an asbestos containing material. Materials that are identified as “none detected” are specified as not containing asbestos.

Conclusion

The following materials were determined to be asbestos containing:

1. Paper and tape wrapped around forced air heating ductwork, taped duct seams, wall register boots throughout the building (selective demolition required for verification)
2. Radiant and domestic pipe insulations(selective demolition required for verification)
3. ~3500 square feet of Transite ™ cement board nailed to the ceilings in eastern portion of building
4. ~110 square feet of floor tile and mastic under sheet flooring in Chafer Alley (front of swinging kitchen doors)
5. ~250 square feet white pebble pattern sheet flooring throughout ancillary kitchen rooms
6. ~1000 square feet of orange pebble pattern sheet flooring in the kitchen, coffee room and throughout ancillary kitchen rooms
7. ~4200 square feet of popcorn acoustical ceiling texture in entry hallway, “The Lounge”, “The Patio room”, “East ballroom”
8. ~365 square feet of brown 9” x 9” floor tile in front west offices.

The following materials contained 1% asbestos or less:

1. Spongy 2’ x 2’ ceiling tiles in the front and back entry halls and “The Lounge”*
2. Block filler (enamel applied to cement masonry units) exterior and interior walls*

* Samples contained a trace of asbestos. The materials are EPA regulated unless further testing by point count method determines that the sample contains 1% asbestos or less. Trace asbestos containing materials are regulated the same in the state of Colorado as materials that contain greater than one percent asbestos. However, the state allows further analyses by point count method to confirm that a material contains one percent asbestos or less. If the material is confirmed to contain one percent or less, state regulation is diminished, and compliance with the pertaining OSHA regulations is not as cost prohibitive. Materials confirmed to contain one percent asbestos or less may remain in the building during complete conventional building demolition.

Further analyses by point count method can be ordered over the phone and does not require an additional site visit. It is recommended that these analyses are requested in the near future before the lab disposes of their sample archive.

The following materials contained 1% asbestos or less:

1. Joint compound associated with roll-on textured drywall (system contains less than one percent asbestos by composite)
2. Window caulking in windows.
3. Glue daubs with ceilings tiles.

The regulatory requirements regarding handling, demolishing transporting and disposal are minimal. These materials may remain in the building during complete conventional building demolition.

The demolition of materials that contain 1% asbestos or less require OSHA handling guidelines be followed. However, a state licensed asbestos abatement contractor is not required to perform such work. It is recommended that a licensed asbestos abatement contractor be retained for this demolition to comply with OSHA requirements regarding the demolition of asbestos containing materials that contain less than 1% asbestos.

The OSHA regulation 29 CFR 1926.1101(g)(1)(ii) and (iii), as well as record-keeping requirements under 29 CFR 1926.1101(n) that are associated with the negative exposure assessment, apply so long as neither asbestos permissible exposure limit (PEL) is exceeded or might be exceeded.

29 CFR 1926.1101(g)(1)(ii) requires:

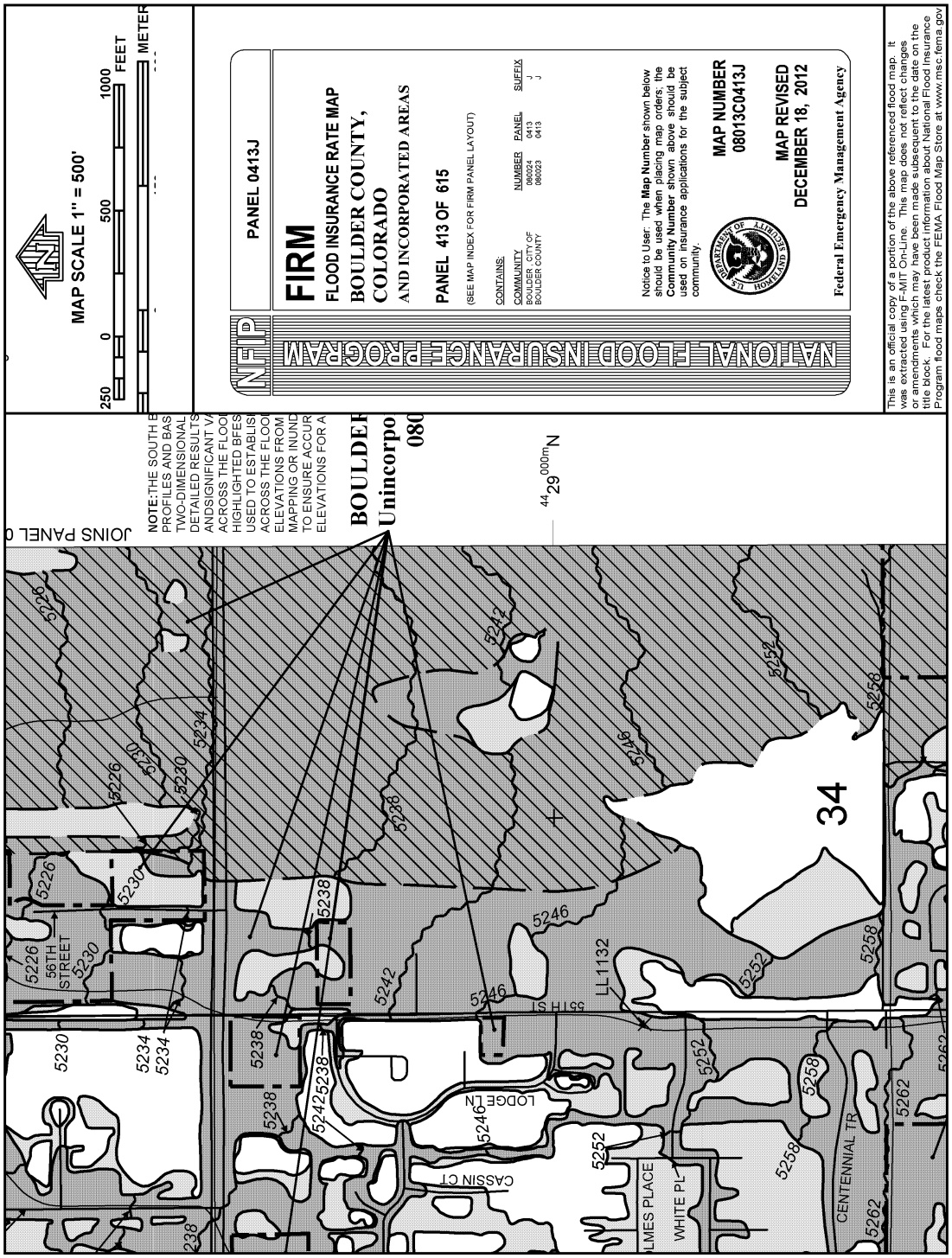
"Wet methods, or wetting agents, to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup, except where employers demonstrate that the use of wet methods is infeasible due to for example, the creation of electrical hazards, equipment malfunction, and, in roofing, except as provide in paragraph (g)(8)(ii) of this section;"
and 29 CFR 1926.1101(g)(1)(iii) requires:

"Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers except in roofing operations, where the procedures specified in paragraph (g)(8)(ii) of this section apply."

The results of this survey pertain only to materials tested. The laboratory reports supporting these findings above are attached.

Please contact Boulder Environmental Management, Inc. with any questions or concerns regarding this report.

Flood Mapping



Flood Insurance Rate Map
Flatiron Event Center and Site

F1

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0413J

FIRM

FLOOD INSURANCE RATE MAP

BOULDER COUNTY, COLORADO

AND INCORPORATED AREAS

PANEL 413 OF 615

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BOULDER, CITY OF	080024	0413	J
BOULDER COUNTY	080023	0413	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
08013C0413J

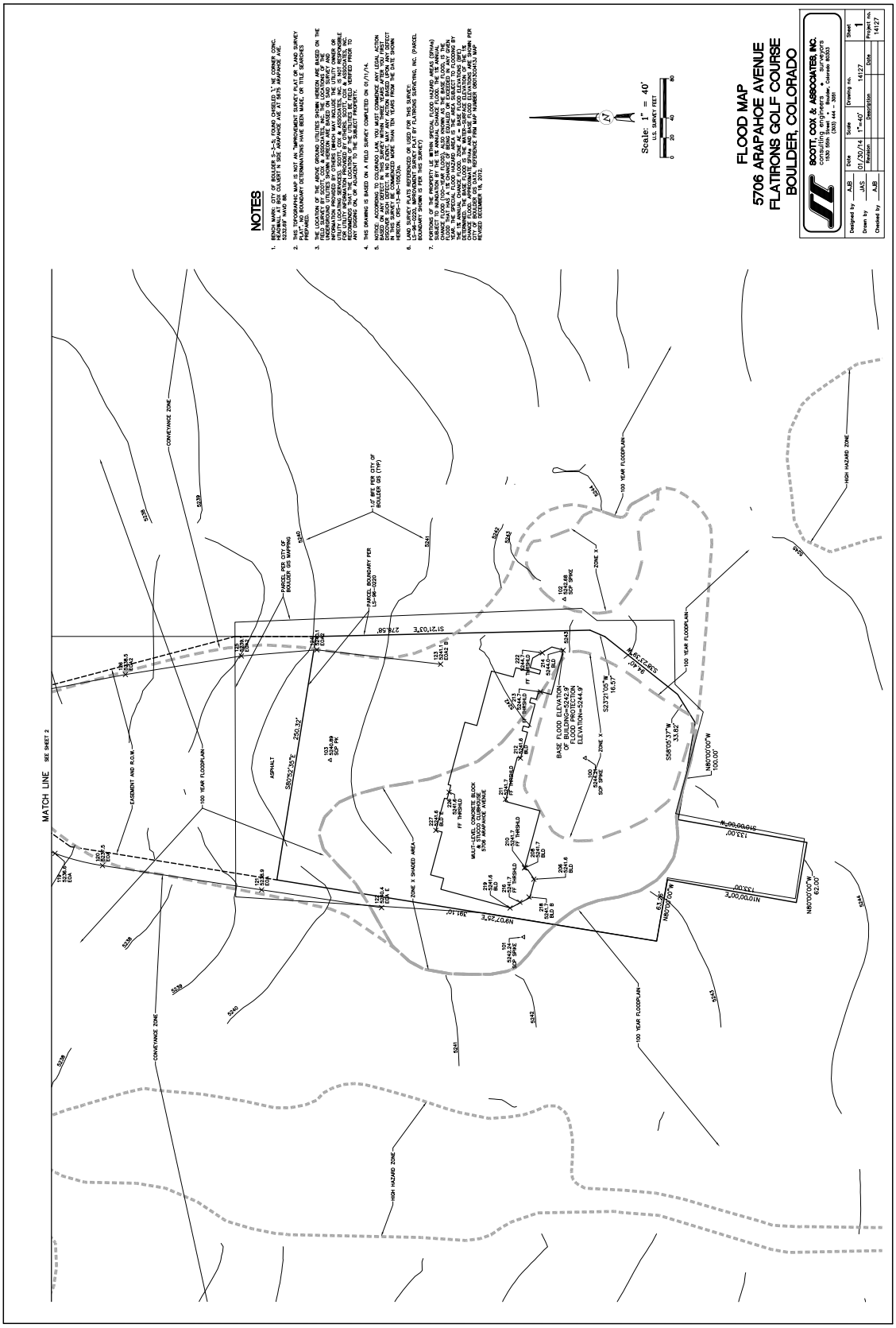
MAP REVISED
DECEMBER 18, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

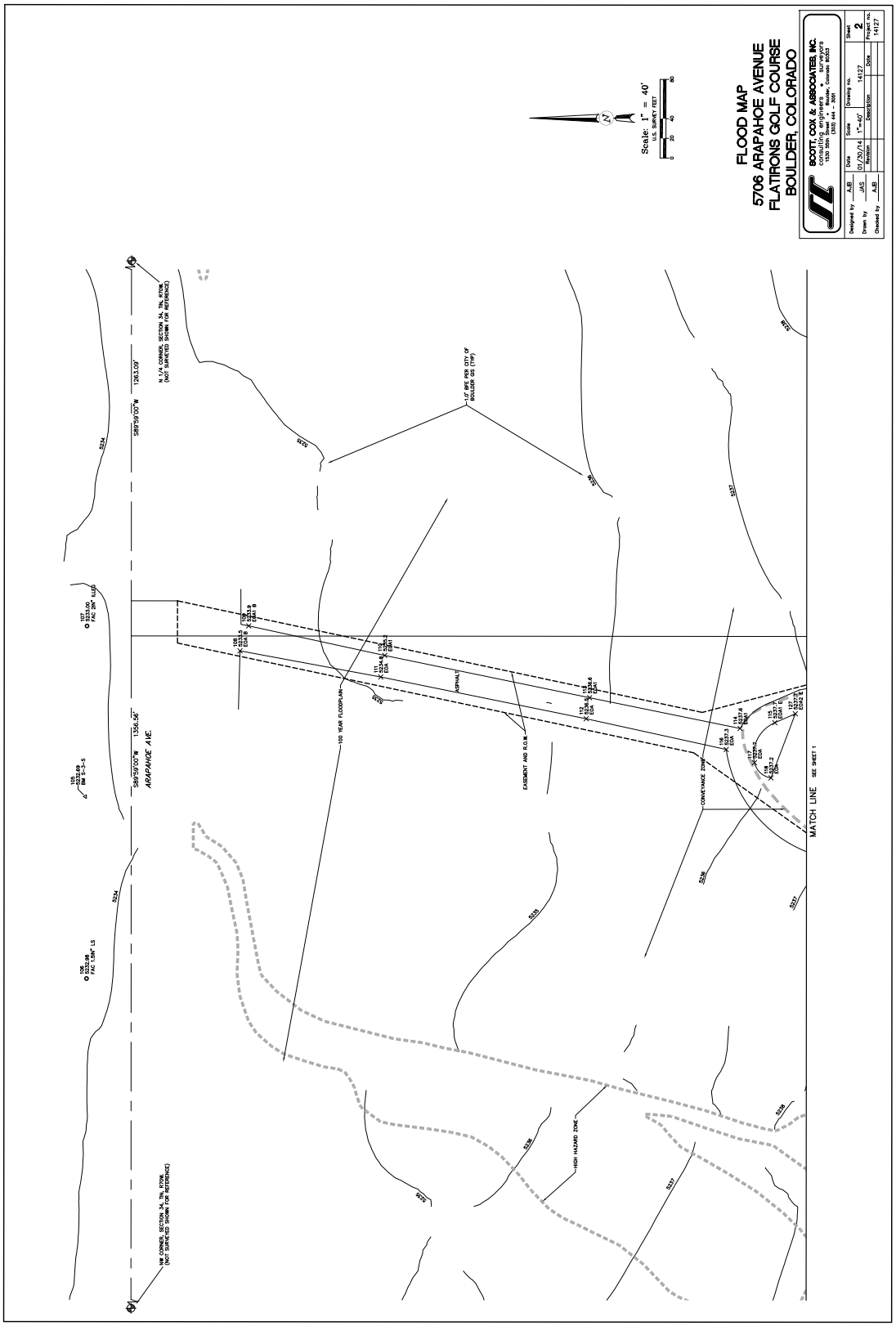
Flood Insurance Rate Map Legend
Flatiron Event Center and Site

F2



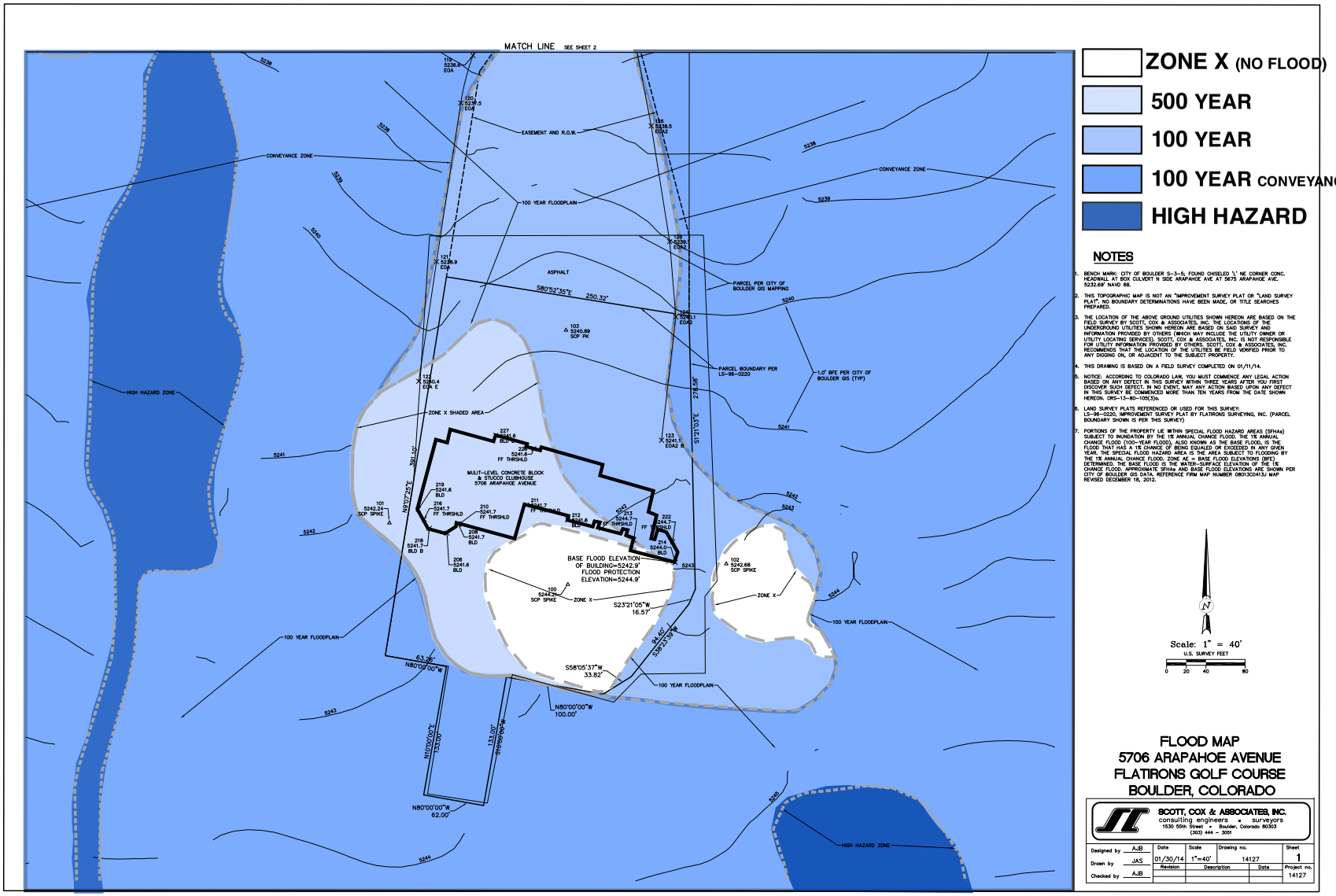
Flood Map Survey
Flatiron Event Center and Site

F3



Flood Map Survey
Flatiron Event Center and Site

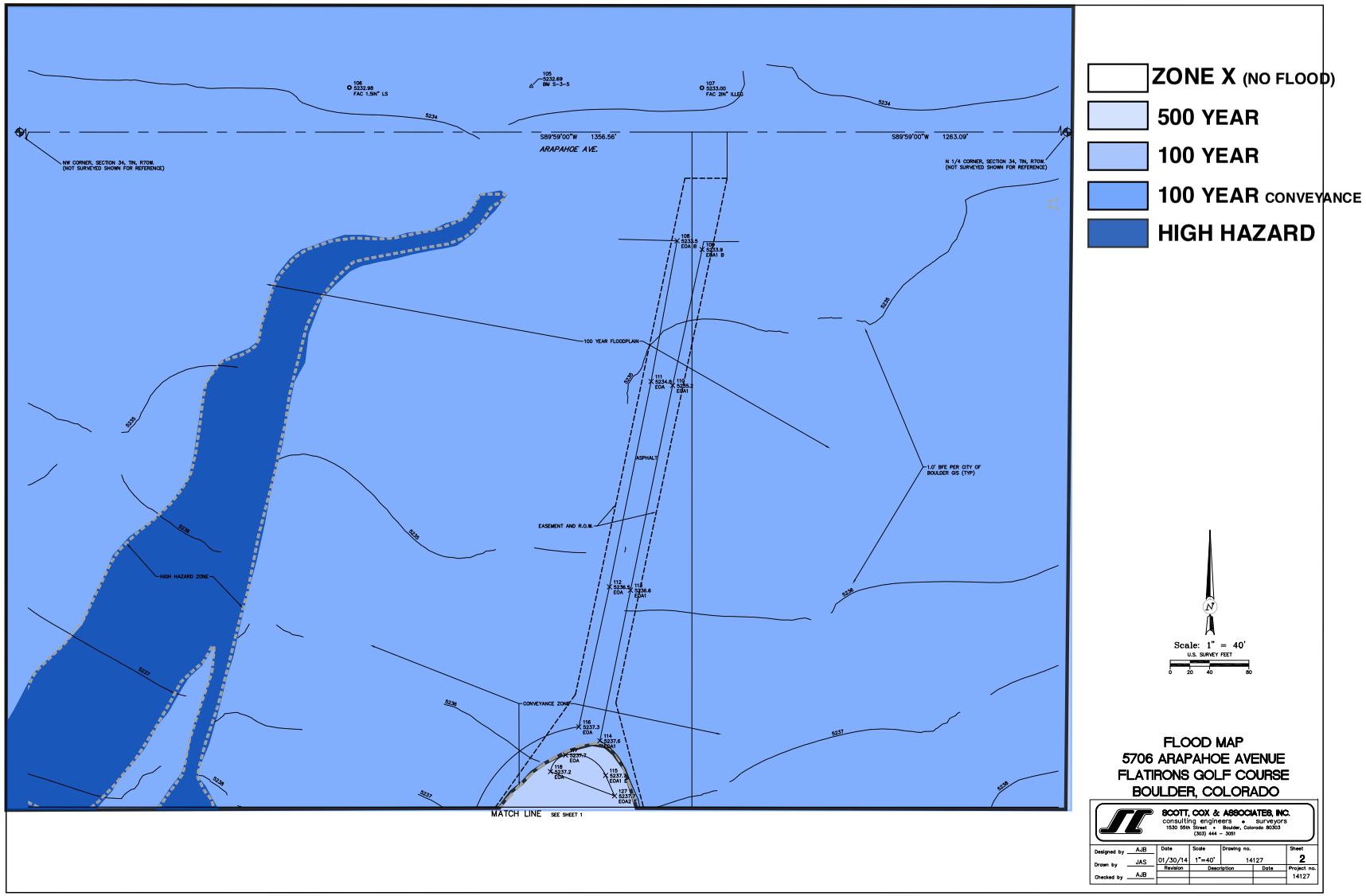
F4



Flood Map
Flatiron Event Center and Site

F5

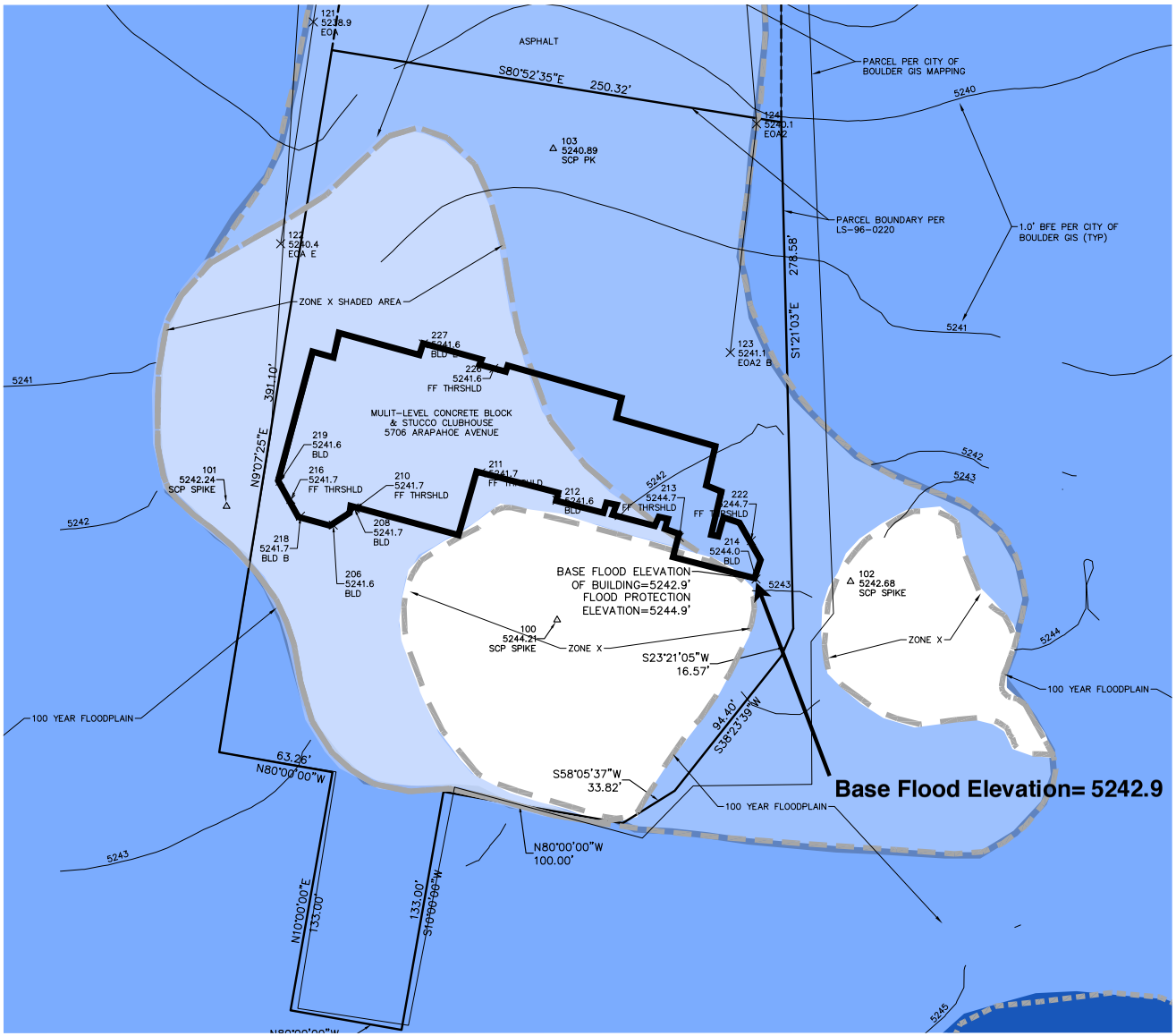
APPENDICES



Flood Map
Flatiron Event Center and Site

F6

APPENDICES



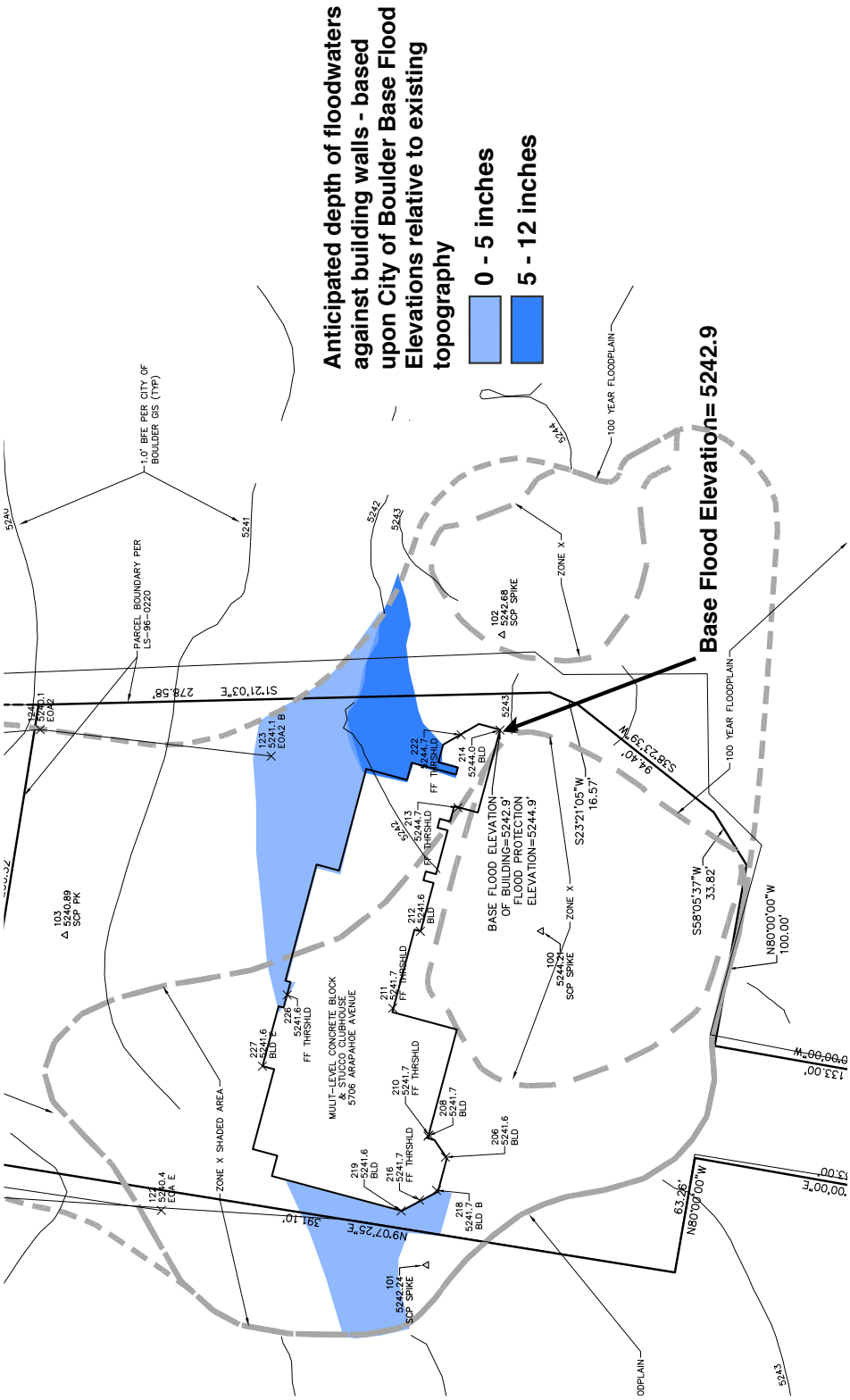
Flood Map - Enlarged
Flatiron Event Center and Site

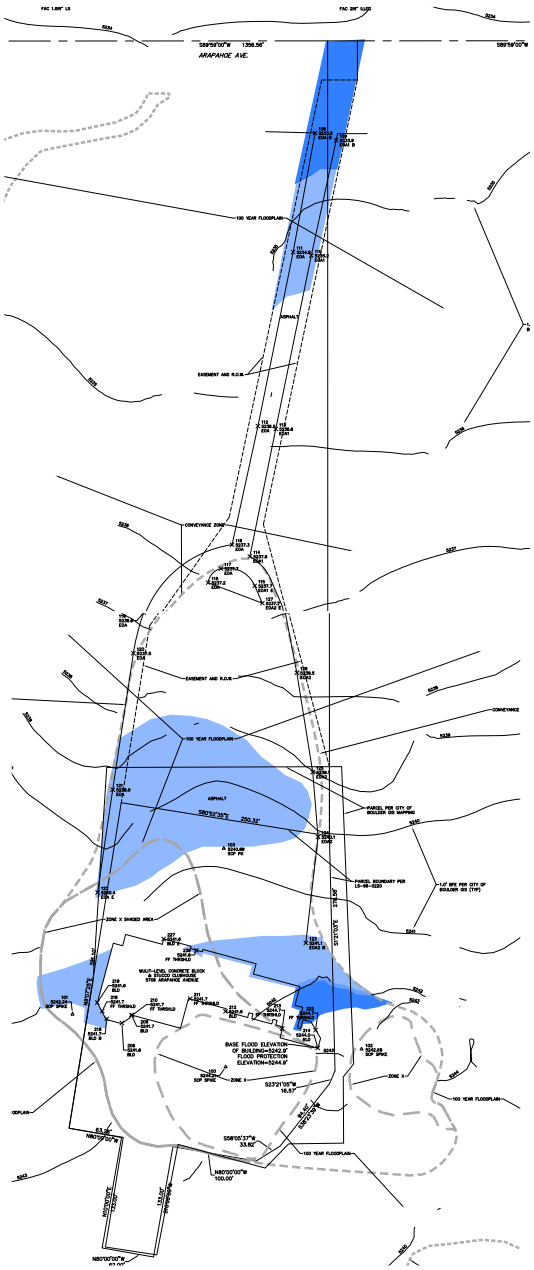
F7

APPENDICES

F8

Flood Map
Flatiron Event Center and Site





Anticipated depth of floodwaters on parking lot and access drive - based upon City of Boulder Base Flood Elevations relative to existing topography

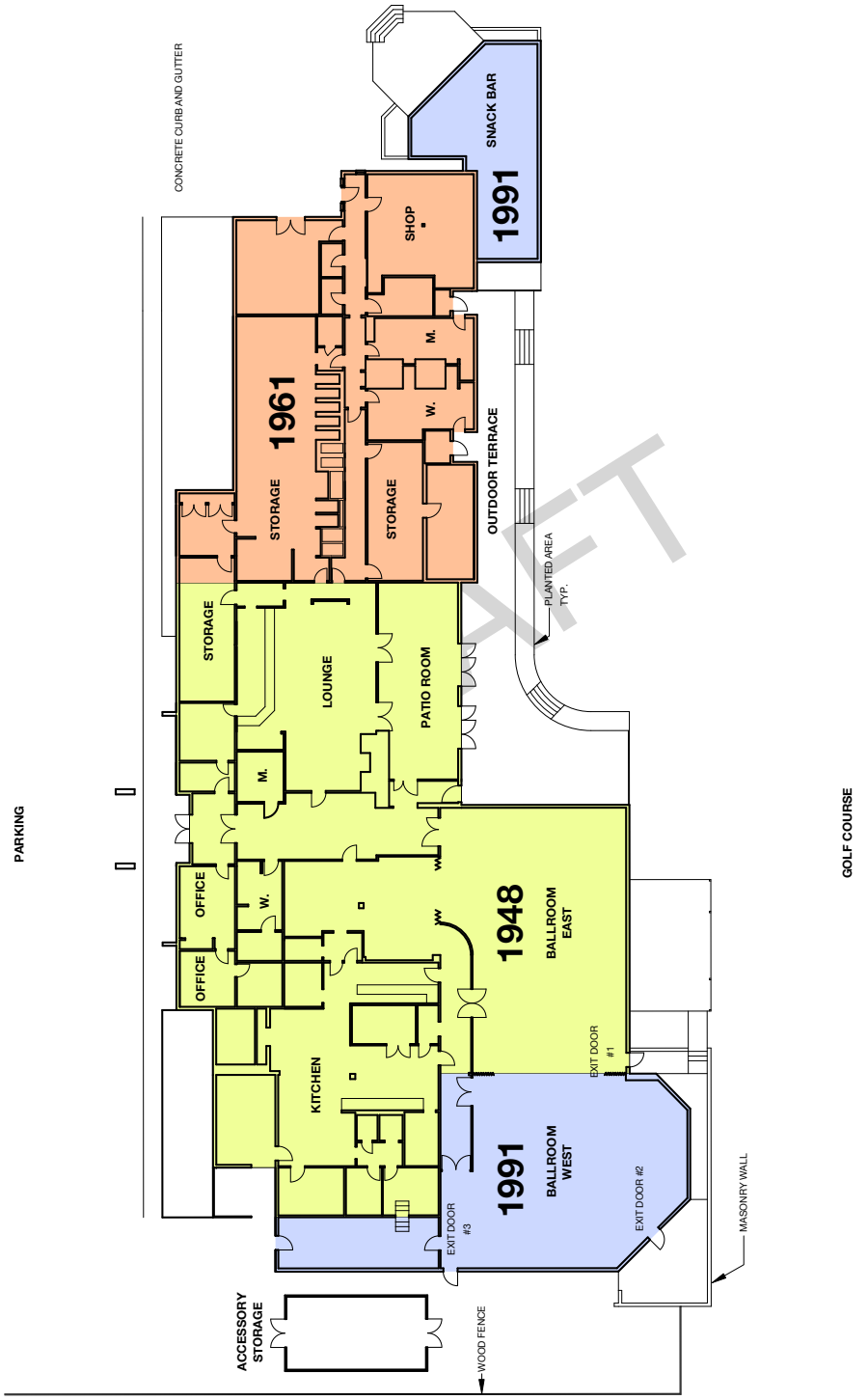
- 0 - 5 inches
- 5 - 12 inches

Flood Map
Flatiron Event Center and Site

F9

APPENDICES

Floor Plan



Floor Plan
Flatiron Event Center
no scale

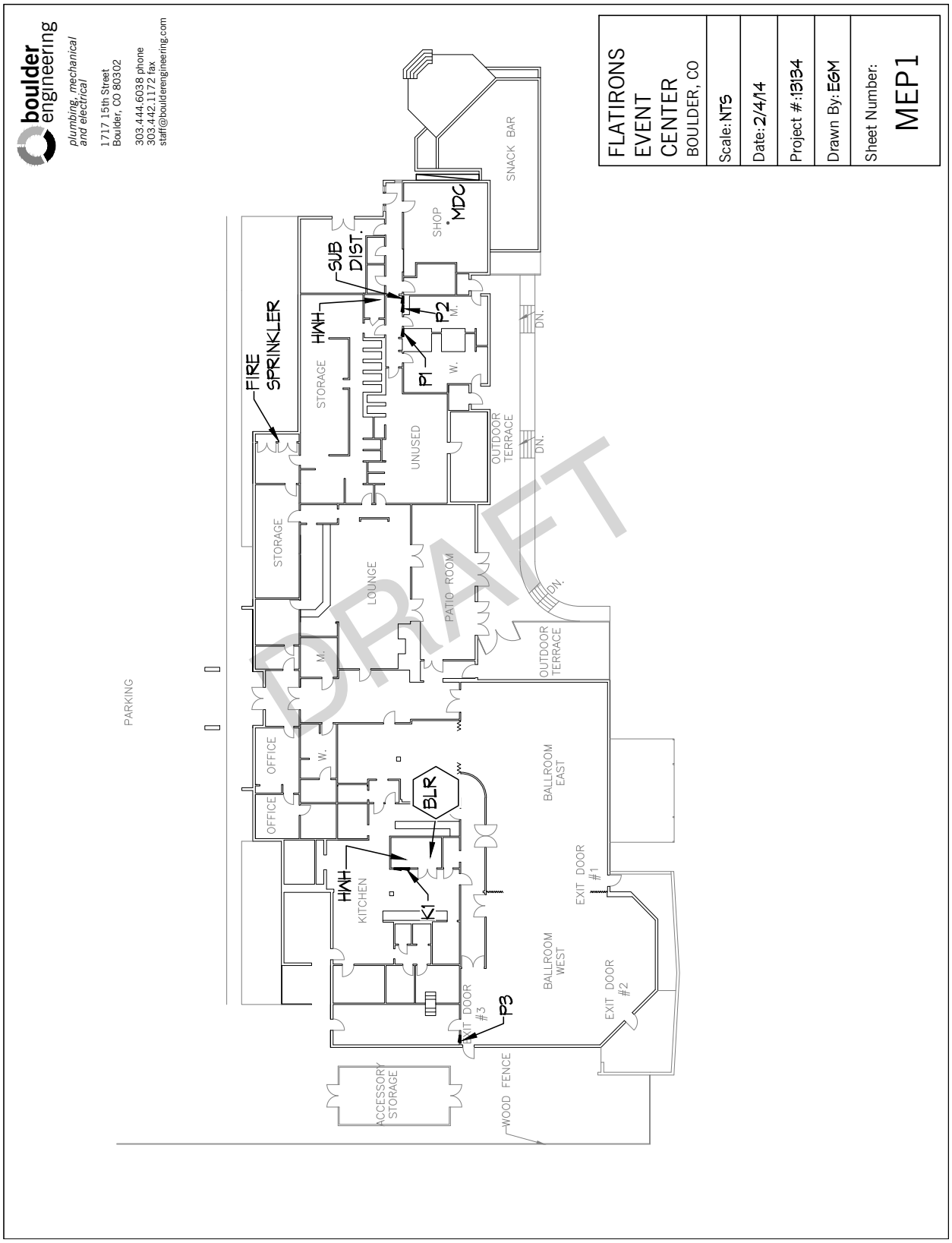
MEP

APPENDIX A – ITEMIZED LIST OF CODE VIOLATIONS

1. Roof top units without proper ventilation – RTU-1, RTU-2, RTU-3, RTU-4
2. Grease hood is not properly sized for equipment and likely has void UL listing.
3. Kitchen exhaust fan 1 is directed towards adjacent roof top unit.
4. Kitchen exhaust fan 2 discharge less than 42” above roof.
5. Kitchen make up air is untempered and not properly interlocked with hood.
6. Kitchen make up air is located within 10’ of plumbing vent
7. Combustion air ducts in boiler room are covered.
8. Combustion air intake terminations on roof are less than 2’ above roof.
9. Boiler water feed lines do not have proper back flow prevention.
10. Gas piping on the roof is not properly insulated.
11. Roof drain & gutter system is badly damaged and not piped per code.
12. Main cold water service does not have proper backflow prevention device.
13. Main electrical gear does not have proper clearances in all areas.
14. Disconnect with exposed live parts on kitchen exhaust fan 2.
15. Electrical disconnects in boiler room do not have proper clearance.
16. Kitchen electrical panels do not have proper clearances.
17. West Office panel does not have proper clearances.
18. Numerous locations on the roof with improperly supported electrical conduit.
19. Exposed wiring on roof subject to damage.
20. Surface mounted conduit run on the floor in the north end.
21. Junction boxes on the roof that have not been properly closed and sealed.
22. The north side roof does not have a receptacle within 25’.

APPENDIX B – ITEMIZED LIST OF SYSTEMS NOT COMPLIANT WITH CURRENT CODES

1. Roof top units that do not meet current efficiency standards – RTU-1, RTU-2, RTU-3, RTU-4, RTU-6, and RTU-7
2. Roof top units that do not have required economizers - RTU-1, RTU-2, RTU-3, RTU-4.
3. Ductwork routed on roof without proper insulation.
4. Boiler does not meet current energy standards.
5. Kitchen water heater does not meet current energy standards.
6. Domestic hot water lines are not insulated.
7. The existing lighting system does not meet current energy standards.
8. Abandoned low voltage and line voltage wiring is no longer allowed. The wire must be removed.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Boulder, CO 80302
303.444.6038 phone
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staff@boulderengineering.com
FLATIRONS EVENT CENTER
BOULDER, CO
Scale: NTS
Date: 2/4/14
Project #: 13134
Drawn By: EGM
Sheet Number: MEP1
DRAFT
PARKING
FIRE SPRINKLER
HWH
SUB DIST.
MDC
SHOP
SNACK BAR
STORAGE
UNUSED
OUTDOOR TERRACE
P1
P2
M.
W.
DN.
LOUNGE
PATIO ROOM
OFFICE
BLR
KITCHEN
KI
BALLROOM EAST
BALLROOM WEST
EXIT DOOR #1
EXIT DOOR #2
EXIT DOOR #3
P3
ACCESSORY STORAGE
WOOD FENCE

PART 3

COSTS

Flatirons Events Center
Cost Estimates of Repairs, Renovation, Replacement

Construction Costs

Within this section is a description of the scope of work and breakdown of costs within various threshold levels of repair/ renovation/replacement for the existing structure. The levels identified as relevant potential outcomes for the structure are as follows:

1. Repair to pre-flood condition
2. Flood proofing of structure
3. Renovation of structure to full code compliance relative to City of Boulder requirements
4. Demolition of the existing Event Center and repair of the snack bar for ongoing use by the golf course
5. Demolition of the entire structure and replacement with 5,000 s.f. golf clubhouse with restaurant as outlined in a 2008 study completed by HVS. Includes modifications to the golf course and driving range as outlined in the 2010 Dye Design Business Plan.
6. Demolition of the entire structure and replacement with 13,000 s.f. golf clubhouse and event center with a ballroom, ancillary meeting spaces, restaurant/snack bar and full commercial kitchen and back of house spaces as outlined in a 2008 study completed by HVS. Includes modifications to the golf course and driving range as outlined in the 2010 Dye Design Business Plan.

Contingency

A 15% contingency line item has been added to all construction costs in the report. This amount should cover any unforeseen conditions or atypical occurrences. It will not cover changes to the scope of work.

Cost Escalation

All costs given in this report are present day 2014 costs. It is reasonable to expect costs to escalate in the future. At this point in time a 3% per annum increase in costs appears to be reasonable and adequate for the foreseeable future. It is possible that economic conditions will change and this escalation factor will need to be revised accordingly.

Given that there are currently no fixed or target dates to implement any of the scenarios described above and given that the actual date of commencement may differ depending upon which scenario is chosen by the City, costs given in this report should be escalated by the following amounts for construction starting in the years listed:

Construction Start:		
	2015	3.0 %
	2016	6.1 %
	2017	9.2 %
	2018	12.5 %
	2019	15.9 %
	2020	19.4 %

Scenario A:
Repair of Building to September 1 2013 Finish and Operation

The scope of work within this scenario includes restoration of the interior finish systems of the Flatirons Event Center to match the condition and quality of those same systems immediately prior to the September 11 2013 flood. This scenario only includes repair of damaged systems. No improvements or other changes are included.

Included within this scope:

1. Carpet and pad replacement, cleaning and sealing of tile, replacement of vinyl base, replacement and repair of millwork, replacement of wall coverings, painting of walls, sound batt insulation replacement, drywall replacement of flood cut partitions, servicing damaged folding partition, repair and replacement of suspended acoustical grid and acoustical tile ceilings, rehabilitation of doors and windows, plumbing fixture repairs, repair and replacement of existing toilet accessories, miscellaneous demolition, site debris removal, a small allowance for mold remediation, and a small allowance for environmental testing.

Excluded from this scope of work:

1. Asbestos abatement, ADA code compliance, flood proofing, civil work, landscaping work, structural upgrades, roof repair, door upgrades, window replacement, flooring upgrades, toilet accessory upgrades, kitchen equipment, life safety upgrades, fire protection upgrades, plumbing upgrades, mechanical upgrades, electrical upgrades, work in the “Just Hit It Grill”, energy code upgrades, and permitting.

Please refer to accompanying Appendix Cost A for a breakdown of included costs.

Total estimated cost for this scope of work: $213,555.00

Scenario B:
Flood Proofing of Structure in Compliance with NFIP Bulletins

The scope of work within this scenario includes restoration of the interior finish systems as described in Scenario A above plus flood proofing of the structure to be in compliance with NFIP requirements.

The flood proofing of the structure is comprised of changes to the existing perimeter walls (materials and construction details) and openings (windows and doors) to make the building effectively watertight. Flood proofing of the structure as described here does not include lifting the structure up above the Base Flood Elevation or making any changes to the site.

Included within this scope:

1. Restoration of interior systems and exterior systems outlined in Scenario A above
2. Flood proofing of the structure in compliance with NFIP Bulletins 2,3: installation of emergency generator, installation of flood proof doors at all perimeter openings, revisions to bottom portions of EIFS walls on south and west elevations, interior sump and pump system, new fiberglass faced gypsum wallboard on exterior walls below the flood protection elevation (FPE), new closed cell polyurethane foam insulation within light framed exterior walls below the FPE, new high capacity exterior sump pumps.

Excluded from this scope of work:

1. Asbestos abatement, ADA code compliance, civil work, landscaping work, structural upgrades, roof repair, door upgrades (other than for flood proofing), window replacement, flooring upgrades, toilet accessory upgrades, kitchen equipment, life safety upgrades, fire protection upgrades, plumbing upgrades, mechanical upgrades, electrical upgrades, work in the “Just Hit It Grill”, energy code upgrades, and permitting.

Please refer to accompanying Appendix Cost B for a breakdown of included costs.

Total estimated cost for this scope of work: $519,374.00

Scenario C:
Renovation of Structure to Full Code Compliance

The scope of work within this scenario includes renovation of the structure to full code compliance. It includes restoration of interior finishes as outlined in Scenario A and flood proofing as outlined in Scenario B along with revisions to the structure to comply with the following codes:

2012 IBC
2012 IFC
2012 IMC
2012 IPC
2012 IECC
2011 NEC
2013 NZE Energy Code
ADA

This scenario essentially removes the roof from the building so that only load bearing structural walls and foundation systems remain. All other construction systems are replaced and/or renovated.

Within this scenario the assessment team considered several alternative sets of construction systems to find the most cost effective set of renovations. For example, a variable flow refrigerant mechanical system was explored because this system could allow the existing roof structure to remain. The cost savings in keeping the existing roof framing was more than offset however by the substantially greater cost of the mechanical system.

Please note that this scenario does not change the footprint of the structure or the size and/or configuration of the primary spaces within the structure. After completion of the scope of work outlined within Scenario C, the structure will still be 17,400 s.f. with the same spaces it currently has.

Included within this scope:

1. Restoration of interior systems and exterior systems outlined in Scenario A above
2. Flood proofing of the structure as outlined in Scenario B above
3. Renovation for full code compliance including: new roof structure, new roof coverings, installation of steel reinforcing within exterior walls, additional anchorage of walls to foundation system, replacement of all exterior windows and glazing, replacement of all exterior doors, replacement of mechanical system, replacement of interior doors to meet ADA requirements, replacement of kitchen flooring, upgrading plumbing fixtures, removal of existing slab on grade in public bathroom, skim coating and leveling of existing flooring, new ceiling systems, replacement of fire protection distribution piping and discharge heads, full asbestos abatement of building, replacement of floor coverings, upgrading thermal performance of the building envelope (exterior walls, edge of floor slab and roof), upgrading electrical system, upgrading lighting, relocation of electrical panels to meet clearance code, re-grading site to promote positive surface drainage away from structure, create ADA accessibility to south side of building, and repair and upgrading of existing sidewalks.

Excluded from this scope of work:

1. Work in the “Just Hit It Grill”, foundation upgrades, kitchen equipment, revisions to parking areas other than what is required for accessibility, revisions to the adjacent golf course and driving range.

Please refer to accompanying Appendix Cost C for a breakdown of included costs.

Total estimated cost for this scope of work: $2,912,725.00

Scenario D/D2:

Demolition of Existing Event Center and Repair of Snack Bar for Ongoing Use by Golf Course and Construction of New Restroom Facilities

The scope of work within this scenario includes the demolition of the existing structure with the exception of the Just Hit It Grill on the east end of the building. The interface between the Grill and the remainder of the structure is to be patched and renovated so that it can remain in operation to service golf course patrons.

Note that the finished floor elevation of the Grill is 5244.7. This is well above the BFE for the structure and within three inches of the FPE for the structure. It may be possible to modify the floor system to be above the FPE and avoid any potential flood proofing of this small portion of the structure.

Also to be constructed as part of this scope of work is a new structure with restroom facilities for use by golf course patrons. The structure is planned as a standard “kit” building to be purchased rather than custom designed.

Within this scope of work is a portion of the asbestos abatement estimate for the structure. Full abatement of the asbestos containing materials within the renovation proposed in Scenario C above is approximately $250,000. A substantial portion of the asbestos containing materials are either non-friable or contain only trace amounts of asbestos. These materials can remain in the structure during full building demolition and can be removed to a standard landfill. We estimate that approximately half of the asbestos abatement cost can be avoided as a result of the building demolition.

Included within this scope:

1. Abatement of all friable asbestos containing materials within the structure, demolition of all portions of the Event Center with the exception of the Just Hit It Grill, minor repair and restoration of the Grill.

Excluded from this scope of work: revisions to parking areas, revisions to the adjacent golf course and driving range.

Please refer to accompanying Appendix Cost D for a breakdown of included costs.

Total estimated cost for this scope of work: $609,550.00

Scenario E:

Demolition of Existing Event Center and Construction of a New Golf Clubhouse with Restaurant with Revisions to Parking Areas, Access Drive and Contiguous Golf Course and Driving Range Areas.

The scope of work within this scenario includes the total demolition of the existing structure.

Within this scope of work is a portion of the asbestos abatement estimate for the structure. Full abatement of the asbestos containing materials within the renovation proposed in Scenario C above is approximately $250,000. A substantial portion of the asbestos containing materials are either non-friable or contain only trace amounts of asbestos. These materials can remain in the structure during full building demolition and can be removed to a standard landfill. We estimate that approximately half of the asbestos abatement cost can be avoided as a result of the building demolition.

On the site of the existing structure construct a new golf clubhouse, approximately 5,000 s.f in size with 1,750 s.f. restaurant, bar and kitchen.

This scenario was outlined in a report prepared by HVS for the City of Boulder in 2008. Please refer to that report for additional information.

Included within this scope of work is removal and reconstruction of the parking lot - raising the elevation of the parking lot by two feet to lift it above the 100 year flood elevation. Removal and reconstruction of the access drive to the point where it meets Arapahoe Avenue is also included.

Also included within this scope of work is the modification of the adjacent golf course and driving range as a result of the revised elevations of the parking area and access drive. These modifications were defined and resulting costs estimated in the 2010 Dye Design Business Plan. The estimated costs from that report have been included in this estimate, although they have not been verified for accuracy or updated for escalation over the past four years. Please refer to the original report for additional information.

Without an actual design to put costs to the assessment team has had to estimate what might be designed and built on this site for this use. We have proposed potential costs for a mid-level fit and finish of the structure.

Please refer to accompanying Appendix Cost E for a breakdown of included costs.

Total estimated cost for this scope of work: $3,359,881.00

Scenario F:
Demolition of Existing Event Center and Construction of a New Event Center with Clubhouse and Restaurant with Revisions to Parking Areas, Access Drive and Contiguous Golf Course and Driving Range Areas.

The scope of work within this scenario includes the total demolition of the existing structure.

Within this scope of work is a portion of the asbestos abatement estimate for the structure. Full abatement of the asbestos containing materials within the renovation proposed in Scenario C above is approximately $250,000. A substantial portion of the asbestos containing materials are either non-friable or contain only trace amounts of asbestos. These materials can remain in the structure during full building demolition and can be removed to a standard landfill. We estimate that approximately half of the asbestos abatement cost can be avoided as a result of the building demolition.

On the site of the existing structure construct a new structure of approximately 13,000 s.f. of which 10,500 s.f. is allocated to a new event center (4,500 s.f. banquet room, 1,000 s.f. of ancillary meeting space, 1,000 s.f. restaurant/ snack bar, 4,000 s.f. kitchen and back of house) and 2,500 s.f. for a new golf clubhouse.

This scenario was outlined in a report prepared by HVS for the City of Boulder in 2008. Please refer to that report for additional information.

Included within this scope of work is removal and reconstruction of the parking lot - raising the elevation of the parking lot by two feet to lift it above the 100 year flood elevation. Removal and reconstruction of the access drive to the point where it meets Arapahoe Avenue is also included.

Also included within this scope of work is the modification of the adjacent golf course and driving range as a result of the revised elevations of the parking area and access drive. These modifications were defined and resulting costs estimated in the 2010 Dye Design Business Plan. The estimated costs from that report have been included in this estimate, although they have not been verified for accuracy or updated for escalation over the past four years. Please refer to the original report for additional information.

Without an actual design to put costs to the assessment team has had to estimate what might be designed and built on this site for this use. We have proposed potential costs based upon a high quality but not excessive level of fit and finish for the structure.

Please refer to accompanying Appendix for a breakdown of included costs.

Total estimated cost for this scope of work: $6,751,049.00

APPENDIX COST A

Scenario A:		
	Repair of Building to September 1 2013 Finish and Operation	
Division	**Scope of Work**	**Cost of Work**
01 - General Requirements		**$ 6,100**
	Project General Conditions	$ 6,100
02 - Existing Conditions		**$ 24,200**
	Site clean-up and repairs	$ 9,500
	Mold Remediation	$ 8,900
	Miscellaneous repairs	$ 1,600
	Miscellaneous Demolition	$ 4,200
06 - Woods and Plastics		**$ 2,400**
	Carpentry	$ 2,400
07 - Thermal and Moisture Protection		**$ 19,800**
	Moisture Protection	$ 3,000
	Insulation	$ 16,800
08 - Openings		**$ 900**
	Refurbish Doors and Hardware	$ 900
09 - Finishes		**$ 131,200**
	Acoustical Treatments	$ 4,100
	Drywall	$ 12,700
	Carpet	$ 84,000
	Ceramic Tile	$ 3,100
	Vinyl Flooring and Base	$ 7,100
	Painting	$ 15,000
	Wall coverings	$ 5,200
10 - Building Specialties		**$ 200**
	Toilet and Bath Accessories	$ 200
15 - Plumbing and Mechanical		**$ 900**
	Plumbing Fixture Repair	$ 900
SUBTOTAL		**$ 185,700**
99 - Contingency - 15%		**$ 27,855**
	Grand Total - Scenario A	**$ 213,555**

APPENDIX COST B

Scenario B:		
	Flood Proofing of Structure in Compliance with NFIP Bulletins	
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 33,130**
	Architecture, Engineering, and Contract Administration	$ 18,624
	Permitting	$ 10,476
	Insurance	$ 1,397
	Performance and Payment Bonding	$ 2,633
01 - General Requirements		**$ 12,500**
	Project General Conditions	$ 11,000
	Construction Fence	$ 500
	Construction Waste/Recycling	$ 1,000
02 - Existing Conditions		**$ 22,000**
	Saw cutting and removal of fourteen existing doors on the south and west side of structure	$ 3,500
	Upgrade existing sump pumps	$ 12,500
	Enlarge existing area drains on south patio	$ 6,000
03 - Concrete		**$ 5,000**
	New Interior Sump Pit	$ 5,000
07 – Thermal and Moisture Protection		**$ 46,000**
	Repair/Modify EFIS work on South and West Portions of Building	$ 32,000
	Closed Cell Polyurethane Foam Insulation	$ 14,000
08 - Openings		**$ 106,400**
	Furnish and installation of fourteen “Flood Proof” exterior doors, frames, and hardware as manufactured by PS Doors	$ 106,400
09 – Finishes		**$ 13,500**
	Skim coating and leveling of existing flooring	$ 13,500
15 – Plumbing and Mechanical		**$ 3,400**
	New Interior Sump Pump	$ 3,400
16 – Electrical		**$ 24,000**
	Installation of New Electrical Emergency Generator	$ 24,000
SUBTOTAL		**$ 265,930**
99 - Contingency - 15%		**$ 39,889**
	Grand Total - Scenario B	**$ 305,819**
	Plus Cost of Scope in Scenario A	**$ 213,555**
	Grand Total Scenario A and B	**$ 519,374**

APPENDIX COST C

Scenario C:		
	Renovation of Structure to Full Code Compliance	
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 259,275**
	Architecture, Engineering, and Contract Administration	$ 145,752
	Permitting	$ 81,986
	Insurance	$ 10,931
	Performance and Payment Bonding	$ 20,606
01 - General Requirements		**$ 95,000**
	Project General Conditions	$ 78,000
	Construction Fence	$ 5,000
	Construction Waste/Recycling	$ 12,000
02 - Existing Conditions		**$ 414,000**
	Asbestos Abatement	$ 250,000
	Demolition of existing roof and structure	$ 33,000
	Demolition of existing exterior windows and doors	$ 14,000
	Saw Cutting and removing of interior doors	$ 65,000
	Re-Grading of site	$ 19,000
	Southern side exterior ADA access walks	$ 9,400
	Upgrades and repairs to existing sidewalks and ramps	$ 23,600
03 - Concrete		**$ 5,000**
	Removal and replacement of existing slab on grade in public bathrooms	$ 5,000
04 - Masonry		**$ 54,000**
	Reinforcing and Grouting of exterior CMU walls	$ 48,000
	Masonry Patching	$ 6,000
05 - Metals		**$ 15,000**
	Miscellaneous steel requirements	$ 15,000
06 – Woods and Plastics		**$ 107,700**
	Installation of new Pre-Engineered Roof Structure	$ 85,000
	Exterior Wall Framing	$ 14,700
	Rough Carpentry	$ 8,000
07 – Thermal and Moisture Protection		**$ 157,000**
	Installation of new EPDM type Roofing	$ 112,000
	New Gutters and Down Spouts	$ 9,000
	Exterior Wall Insulation	$ 32,000
	Slab Edge insulation	$ 4,000
08 – Openings		**$ 85,600**
	Furnish and installation of new thermally broken windows	$ 32,000
	Furnish and installation of insulated glazing	$ 12,000
	Furnish and installation of thermally broken exterior doors and frames	$ 8,400
	Replacement of interior doors	$ 33,200
09 – Finishes		**$ 252,700**
	Skim coating and leveling of existing flooring	$ 13,500
	Replacement of Kitchen flooring	$ 10,200
	Replacement of floor coverings	$ 56,000
	Exterior Stucco	$ 51,000
	General replacement of partitions	$ 16,000
	General Building Painting	$ 52,000
	New ceilings though out building	$ 54,000
10 – Building Specialties		**$ 7,200**
	Upgrading Toilet and Bath accessories	$ 3,200
	Signage	$ 4,000
11 – Equipment		**$ 48,000**
	New Kitchen Exhaust System	$ 48,000
	New Kitchen Equipment	Excluded/By Operator
13 – Special Construction		**$ 60,000**
	New Fire Protection Heads and Piping	$ 60,000
15 – Plumbing and Mechanical		**$ 321,700**
	Replacement of domestic hot water heating system	$ 90,000
	Replacement of ductwork and mechanical heating and air system	$ 210,000
	General Pipe and Duct Insulation	$ 13,700
	Upgrade of existing plumbing fixtures	$ 8,000
16 – Electrical		**$ 139,000**
	Relocation of electrical panels	$ 12,000
	Upgrading existing electrical system	$ 52,200
	General Conduit and Re-Wiring	$ 35,000
	Upgrade lighting	$ 21,800
	Home-Run Replacement	$ 18,000
17 – Special Systems		**$ 60,000**
	Existing/Abandoned Low Voltage wiring removal	$ 6,000
	Direct Digital Control System	$ 54,000
SUBTOTAL		**$ 2,081,175**
99 - Contingency - 15%		**$ 312,176**
	Grand Total - Scenario C	**$ 2,393,351**
	Plus Cost of Scope in Scenario A	**$ 213,555**
	Plus Cost of Scope in Scenario B	**$ 305,819**
	Grand Total Scenario A, B, and C	**$ 2,912,725**

APPENDIX COST D

Scenario D:		
Demolition of Existing Event Center and Repair of Snack Bar for Ongoing Use by Golf Course		
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 58,062**
	Architecture, Engineering, and Contract Administration	$ 32,640
	Permitting	$ 18,360
	Insurance	$ 2,448
	Performance and Payment Bonding	$ 4,614
01 - General Requirements		**$ 33,000**
	Project General Conditions	$ 12,000
	Construction Fence	$ 5,000
	Construction Waste/Recycling	$ 16,000
02 - Existing Conditions		**$ 321,500**
	Demolition of existing Flatiron's Event Center	$ 65,000
	Asbestos Abatement	$ 125,000
	Refurbish underground utilities	$ 24,000
	Import fill for balanced site	$ 28,000
	Asphalt parking lot repairs	$ 12,000
	Raise Grade between Pro-Shop and "Just Hit It Grill"	$ 3,000
	New Landscaping for Demolished Event Center	$ 52,500
	New Sidewalks and adjustments	$ 12,000
08 – Openings		**$ 22,500**
	Upgrade exterior doors	$ 4,500
	Upgrade exterior Glass Storefront System	$ 18,000
09 – Finishes		**$ 10,000**
	Re-Paint Exterior	$ 6,000
	Re-Paint Interior	$ 4,000
16 – Electrical		**$ 21,000**
	Re-feed electrical power to "Just Hit It Grill"	$ 21,000
SUBTOTAL		**$ 466,062**
99 - Contingency - 15%		**$ 69,909**
	Grand Total - Scenario D	**$ 466,062**
Scenario D-1:		
Demolition of Snack Bar		
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 7,258**
	Architecture, Engineering, and Contract Administration	$ 4,080
	Permitting	$ 2,295
	Insurance	$ 306
	Performance and Payment Bonding	$ 577
01 - General Requirements		**$ 8,000**
	Project General Conditions	$ 4,000
	Construction Fence	$ 1,000
	Construction Waste/Recycling	$ 3,000
02 - Existing Conditions		**$ 43,000**
	Demolition of existing "Just Hit It Grill"	$ 24,000
	Import Fill for balanced site	$ 4,000
	Asphalt Repairs	$ 3,000
	Abandon underground utilities	$ 4,000
	New Landscaping under "Just Hit It Grill"	$ 8,000
SUBTOTAL		**$ 58,258**
99 - Contingency - 15%		**$ 8,739**
	Grand Total - Scenario D-1	**$ 66,996**
	Plus Cost of Scope in Scenario D	**$ 466,062**
	Less Snack Bar Upgrades	**$ (43,921)**
	Grand Total - Scenario D and D-1	**$ 489,138**

APPENDIX COST D - continued

Scenario D-2:		
	Construction of New Women's and Men's Bathroom Facility	
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 15,419**
	Architecture, Engineering, and Contract Administration	$ 8,748
	Permitting	$ 4,921
	Insurance	$ 656
	Performance and Payment Bonding	$ 1,094
01 - General Requirements		**$ 9,500**
	Project General Conditions	$ 8,000
	Construction Fence	$ 1,000
	Construction Waste/Recycling	$ 500
02 - Existing Conditions		**$ 15,300**
	Building Pad Preparation	$ 1,500
	Domestic Water - Line	$ 4,800
	Raise Grade between Pro-Shop and "Just Hit It Grill"	$ 3,000
	New Sidewalks and stoops	$ 6,000
03 - Concrete		**$ 5,526**
	Building Slab-On-Grade	$ 5,526
04 - Masonry		**$ 22,501**
	CMU Walls	$ 22,501
06 - Carpentry		**$ 6,111**
	Engineered Lumber Girders	$ 4,200
	Roof Sheathing	$ 1,911
07 - Thermal and Moisture Protection		**$ 10,425**
	Standing Seam Metal Roofing	$ 10,425
08 – Openings		**$ 2,000**
	New ADA Compliant Doors	$ 1,400
	Mechanical Chase Door	$ 600
	Louver Screens	$ 1,600
09 - Finishes		**$ 8,004**
	New ADA Compliant HM Doors	$ 1,800
	New HM Mechanical Door	$ 900
	Paint CMU	$ 3,750
	Sealed Concrete	$ 1,554
10 - Specialties		**$ 6,335**
	Toilet Compartments	$ 2,400
	Urinal Screens	$ 900
	Grab Bars	$ 480
	Toilet Paper Dispensers	$ 255
	Soap Dispensers	$ 1,000
	Mirror	$ 500
	Electric Hand Dryer	$ 800
15 - Mechanical		**$ 11,750**
	Water Closets	$ 2,400
	Urinals	$ 1,000
	Lavatories	$ 1,600
	Exterior Water Bubblers	$ 1,800
	Utility Sink	$ 850
	Floor Drains	$ 2,700
	Instant Hot Water Heater	$ 1,400
16 – Electrical		**$ 11,900**
	Lighting	$ 4,600
	Electrical Meter	$ 1,500
	Electrical Panel	$ 1,800
	Heat Tracing of piping	$ 2,400
	Power Receptacles	$ 1,600
SUBTOTAL		**$ 124,772**
99 - Contingency - 15%		**$ 18,716**
	Grand Total - Scenario D-2	**$ 143,487**
	Plus Cost of Scope in Scenario D	**$ 466,062**
	Grand Total Scenario D and D-2	**$ 609,550**

APPENDIX COST E

Scenario E:		
Demolition of Existing Event Center and Construction of a New Golf Clubhouse with Restaurant		
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 245,682**
	Architecture, Engineering, and Contract Administration	$ 138,111
	Permitting	$ 77,687
	Insurance	$ 10,358
	Performance and Payment Bonding	$ 19,525
01 - General Requirements		**$ 113,758**
	Project General Conditions	$ 96,758
	Construction Fence	$ 5,000
	Construction Waste/Recycling	$ 12,000
02 - Existing Conditions		**$ 870,333**
	Demolition of existing "Just Hit It Grill"	$ 24,000
	Demolition of existing Flatiron's Event Center	$ 65,000
	Asbestos Abatement	$ 125,000
	Earthwork	$ 55,000
	Utilities	$ 25,000
	Landscaping	$ 30,000
	Raise Parking lot 24"	$ 69,611
	Asphalt Paving	$ 446,222
	Parking Lot Striping	$ 6,500
	Site Concrete	$ 24,000
03 - Concrete		**$ 63,333**
	Foundations	$ 23,333
	Slab on Grade	$ 40,000
04 - Masonry		**$ 8,000**
	Interior Masonry Partitions	$ 8,000
05 - Metals		**$ 76,250**
	Structural Steel	$ 70,000
	Miscellaneous steel requirements	$ 6,250
06 – Woods and Plastics		**$ 17,000**
	Rough Carpentry	$ 5,000
	Millwork/Cabinetry	$ 12,000
07 – Thermal and Moisture Protection		**$ 130,014**
	Roofing	$ 75,000
	Sheet Metal Work	$ 9,000
	Exterior Wall Insulation	$ 11,312
	Interior Insulation	$ 9,250
	Exterior Siding	$ 25,452
08 – Openings		**$ 17,700**
	Exterior Doors	$ 6,000
	Exterior Windows	$ 5,200
	Interior Doors	$ 5,000
	Misc Louvers	$ 1,500
09 – Finishes		**$ 79,000**
	Drywall Partitions	$ 17,500
	Tile	$ 1,500
	Acoustical Ceilings	$ 15,000
	Wall Coverings	$ 3,500
	Flooring	$ 17,000
	Painting	$ 8,750
	Epoxy Coatings in Kitchen	$ 15,750
10 – Building Specialties		**$ 12,750**
	Building Specialties	$ 8,750
	Signage	$ 4,000
11 – Equipment		**$ 115,000**
	Kitchen Exhaust System	$ 30,000
	Kitchen Equipment	$ 85,000
13 – Special Construction		**$ 30,000**
	Fire Protection System	$ 30,000
15 – Plumbing and Mechanical		**$ 100,000**
	New Plumbing System	$ 45,000
	New Mechanical System	$ 55,000
16 – Electrical		**$ 70,000**
	New Electrical System	$ 70,000
17 – Special Systems		**$ 23,250**
	Fire Alarm System	$ 11,250
	Direct Digital Control System	$ 12,000
SUBTOTAL		**$ 1,972,070**
99 - Contingency - 15%		**$ 295,811**
	Grand Total - Scenario E Building and Parking Costs	**$ 2,267,881**
	Plus Cost of Modifications to Golf Course and Driving Range per 2010 Dye Business Plan	**$ 1,092,000**
	Grand Total - Scenario E	**$ 3,359,881**

APPENDIX COST F

Scenario F:		
Demolition of Existing Event Center and Construction of a New Event Center w/ Golf Clubhouse with Restaurant		
Division	**Scope of Work**	**Cost of Work**
00 - Project Controls		**$ 613,052**
	Architecture, Engineering, and Contract Administration	$ 344,629
	Permitting	$ 193,854
	Insurance	$ 25,847
	Performance and Payment Bonding	$ 48,722
01 - General Requirements		**$ 319,206**
	Project General Conditions	$ 279,206
	Construction Fence	$ 16,000
	Construction Waste/Recycling	$ 24,000
02 - Existing Conditions		**$ 1,217,333**
	Demolition of existing "Just Hit It Grill"	$ 24,000
	Demolition of existing Flatiron's Event Center	$ 65,000
	Asbestos Abatement	$ 125,000
	Earthwork	$ 145,000
	Utilities	$ 110,000
	Landscaping	$ 85,000
	Raise Parking lot 24"	$ 69,611
	Asphalt Paving	$ 494,222
	Parking Lot Striping	$ 7,500
	Site Concrete	$ 92,000
03 - Concrete		**$ 195,722**
	Foundations	$ 72,222
	Slab on Grade	$ 123,500
04 - Masonry		**$ 32,000**
	Interior Masonry Partitions	$ 32,000
05 - Metals		**$ 208,130**
	Structural Steel	$ 182,000
	Miscellaneous steel requirements	$ 26,130
06 – Woods and Plastics		**$ 116,350**
	Rough Carpentry	$ 13,000
	Millwork	$ 103,350
07 – Thermal and Moisture Protection		**$ 348,670**
	Roofing	$ 195,000
	Sheet Metal Work	$ 36,000
	Exterior Wall Insulation	$ 29,640
	Interior Insulation	$ 34,450
	Exterior Siding	$ 53,580
08 – Openings		**$ 78,500**
	Exterior Doors	$ 31,500
	Exterior Windows	$ 22,100
	Interior Doors	$ 20,400
	Misc Louvers	$ 4,500
09 – Finishes		**$ 481,000**
	Drywall Partitions	$ 110,500
	Tile	$ 8,000
	Acoustical/Gypsum Ceilings	$ 68,250
	Wall Coverings	$ 18,000
	Flooring	$ 117,000
	Painting	$ 107,250
	Epoxy Coatings in Kitchen	$ 52,000
10 – Building Specialties		**$ 107,500**
	Building Specialties	$ 58,500
	Operable Partitions	$ 36,000
	Signage	$ 13,000
11 – Equipment		**$ 480,000**
	Kitchen Exhaust System	$ 48,000
	Kitchen Equipment	$ 432,000
13 – Special Construction		**$ 84,500**
	Fire Protection System	$ 84,500
15 – Plumbing and Mechanical		**$ 321,750**
	New Plumbing System	$ 130,000
	New Mechanical System	$ 191,750
16 – Electrical		**$ 221,000**
	New Electrical System	$ 221,000
17 – Special Systems		**$ 96,200**
	Fire Alarm System	$ 42,250
	Direct Digital Control System	$ 53,950
SUBTOTAL		**$ 4,920,912**
99 - Contingency - 15%		**$ 738,137**
	Grand Total - Scenario F Building and Parking Costs	**$ 5,659,049**
	Plus Cost of Modifications to Golf Course and Driving Range per 2010 Dye Business Plan	**$ 1,092,000**
	Grand Total - Scenario F	**$ 6,751,049**